



Shelby County Health Department  
Office of Epidemiology Annual Report  
2013



**Public Health**  
Prevent. Promote. Protect.  
Shelby County Health Department

## TABLE OF CONTENTS

LIST OF TABLES 1 ONE .....	4
LIST OF FIGURES 2 TWO .....	6
INTRODUCTION 3 THREE .....	8
LIST OF REPORTABLE DISEASES AND CONDITIONS IN TENNESSEE, 2013 .....	11
VACCINE PREVENTABLE DISEASES 4 FOUR .....	18
MUMPS .....	18
PERTUSSIS .....	19
HEPATITIS 5 FIVE .....	22
HEPATITIS A .....	22
HEPATITIS B .....	22
HEPATITIS C .....	24
BACTERIAL INVASIVE DISEASES 6 SIX.....	26
HAEMOPHILUS INFLUENZA (INVASIVE DISEASE) .....	26
MENINGOCOCCAL ( <i>NEISSERIA MENINGITIDIS</i> ) INFECTION .....	28
METHICILLIN-RESISTANT <i>STAPHYLOCOCCUS AUREUS</i> (MRSA).....	28
STREPTOCOCCAL DISEASE (INVASIVE GROUP A) .....	30
STREPTOCOCCAL DISEASE (INVASIVE GROUP B) .....	31
<i>STREPTOCOCCUS PNEUMONIAE</i> INVASIVE DISEASE (IPD) .....	32
VANCOMYCIN RESISTANT ENTEROCOCCI (VRE) INVASIVE DISEASE .....	33
ENTERIC DISEASES 7 SEVEN.....	36
CAMPYLOBACTERIOSIS .....	37
CRYPTOSPORIDIOSIS .....	40
ESCHERICHIA COLI, SHIGA TOXIN-PRODUCING (STEC) .....	41
SALMONELLOSIS .....	43
SHIGELLOSIS .....	45
RESPIRATORY DISEASES 8 EIGHT .....	48
INFLUENZA 2013-2014 SEASON HIGHLIGHTS.....	48
LEGIONELLOSIS.....	49

DISEASE OUTBREAKS 9   NINE .....	51
2013 LEGIONELLOSIS OUTBREAK INVESTIGATION .....	51
VECTOR-BORNE DISEASES 10   TEN .....	53
LYME DISEASE .....	54
SPOTTED FEVER RICKETTSIOSIS.....	55
WEST NILE VIRUS.....	57
MATERNAL AND CHILD HEALTH 11   ELEVEN .....	60
INFANT MORTALITY.....	60
PRETERM BIRTHS.....	62
LOW BIRTH WEIGHT BIRTHS.....	64
TEEN FERTILITY RATES .....	66
CHEMICAL/TOXIN POISONING 12   TWELVE .....	68
CARBON MONOXIDE POISONING.....	68
LEAD POISONING.....	68

## LIST OF TABLES 1|ONE

Table 1 Shelby County and Tennessee Population Estimates, 2000-2013 .....	14
Table 2 Shelby County Population by Age Group, Gender, Race, 2013 .....	15
Table 3 Confirmed Cases of Reportable Diseases in Shelby County, 2003-2013 .....	16
Table 4 Confirmed/Probable Cases of Reportable Diseases in Shelby County by Age Group, 2013 .....	17
Table 5 Incidence of Pertussis, Shelby County, TN, 2013 .....	20
Table 6 Incidence of Hepatitis in Shelby County, 2013 .....	22
Table 7 Incidence of Hepatitis B acute infection, Shelby County, TN, 2013 .....	23
Table 8 Incidence of Hepatitis B chronic infection, Shelby County, TN, 2013 .....	23
Table 9 Incidence of Bacterial Invasive Diseases in Shelby County, 2013 .....	26
Table 10 Incidence of Haemophilus Influenza in Shelby County, 2013 .....	26
Table 11 Incidence of Confirmed MRSA Infection in Shelby County, 2013 .....	29
Table 12 Incidence of Invasive Group A Streptococcal Infection in Shelby County, 2013 .....	30
Table 13 Incidence of Invasive Group B Streptococcal Infection in Shelby County, 2013 .....	31
Table 14 Incidence of <i>Streptococcus Pneumoniae</i> Invasive Disease in Shelby County, 2013 .....	33
Table 15 Incidence of Vancomycin resistant enterococci (VRE) Invasive Disease in Shelby County, 2013 .....	34
Table 16 Incidence of Enteric Diseases in Shelby County, 2013 .....	36
Table 17 Incidence* of laboratory-confirmed bacterial and parasitic infections, and post diarrheal hemolytic uremic syndrome (HUS), by year and pathogen, Foodborne Diseases Active Surveillance Network (FoodNet), United States, 2003–2013† .....	37
Table 18 Incidence of Campylobacteriosis in Shelby County, 2013 .....	38
Table 19 Incidence of Cryptosporidiosis in Shelby County, 2013 .....	40
Table 20 Incidence of Shiga toxin-Producing E. coli (STEC) Infection in Shelby County, 2013.....	41
Table 21 Incidence of Salmonellosis in Shelby County, 2013 .....	43
Table 22 Incidence of Shigellosis in Shelby County, 2013.....	45
Table 23 Incidence of Respiratory Diseases in Shelby County, 2013 .....	48
Table 24 Incidence of Legionellosis in Shelby County, 2013 .....	49
Table 25 Description of outbreaks in Shelby County, 2011-2013.....	51
Table 26 Characteristics of Confirmed cases, June 1- June 30, 2013 (n=7) .....	52

Table 27 Incidence of Vector-Borne Diseases in Shelby County, 2013 .....	53
Table 28 Incidence of Suspect Lyme Disease in Shelby County, 2013 .....	54
Table 29 Incidence of probable/suspect Spotted Fever Rickettsiosis in Shelby County, 2013 .....	56
Table 30 Human Cases of West Nile Virus and Deaths, Shelby County, 2002-2013 .....	58
Table 31 Incidence of West Nile Virus neuroinvasive disease in Shelby County, 2013 .....	58
Table 32 Incidence of West Nile Virus non-neuroinvasive disease in Shelby County, 2013 .....	59
Table 33 Number of Infant Deaths, Live Births and Infant Mortality Rate, 2003-2013 .....	61
Table 34 Number of Preterm Births, Live Births and Preterm Birth Rate, 2003-2013 .....	63
Table 35 Number of Low Birth Weight Births, Live Births and Low Birth Weight Birth Rate, 2003-2013 .....	65
Table 36 Number of Teen Births, Live Births and Teen Fertility Rate, 2003-2013 .....	67
Table 37 CLPPP Childhood Lead Screenings 2003-2013 .....	69

## LIST OF FIGURES 2|TWO

Figure 1 Number of Cases and Incidence Rate of Mumps, Shelby County, TN, 2003-2013 .....	19
Figure 2 Number of Cases and Incidence Rate of Pertussis, Shelby County, TN, 2003-2013 .....	20
Figure 3 Pertussis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013 .....	21
Figure 4 Percent of Pertussis Cases by Age Group, Shelby County, TN, 2013 .....	21
Figure 5 Number of Cases and Incidence Rate of Hepatitis B Acute Infection, Shelby County, TN, 2003-2013.....	24
Figure 6 Hepatitis B acute Infection incidence in Shelby County and Tennessee, 5 year averages, 2003-2013 .....	24
Figure 7 Number of Cases and Incidence Rate of Haemophilus Influenza, Shelby County, TN, 2003-2013.....	27
Figure 8 Haemophilus Influenza Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013.....	27
Figure 9 Number of Cases and Incidence Rate of Neisseria meningitidis, Shelby County, TN, 2003-2013 .....	28
Figure 10 Number of Cases and Incidence Rate of Methicillin-Resistant Staphylococcus Aureus, Shelby County, TN, 2003-2013.....	29
Figure 11 Methicillin-Resistant Staphylococcus aureus Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013 .....	29
Figure 12 Number of Cases and Incidence Rate of Invasive Group A Strep, Shelby County, TN, 2003-2013 .....	30
Figure 13 Invasive Group A Strep Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013.....	31
Figure 14 Number of Cases and Incidence Rate of Invasive Group B Strep, Shelby County, TN, 2003-2013 .....	32
Figure 15 Invasive Group B Strep Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013 .....	32
Figure 16 Number of Cases and Incidence Rate of <i>Strep Pneumoniae</i> Invasive Disease, Shelby County, TN, 2003-2013 .....	33
Figure 17 Number of Cases and Incidence Rate of VRE Invasive Disease, Shelby County, TN, 2003-2013 .....	34
Figure 18 Invasive VRE Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013 .....	35
Figure 19 Number of Cases and Incidence Rate of Campylobacteriosis, Shelby County, TN, 2003-2013 .....	39
Figure 20 Campylobacteriosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013 .....	39
Figure 21 Number of Cases and Incidence Rate of Cryptosporidiosis, Shelby County, TN, 2003-2013.....	40
Figure 22 Cryptosporidiosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013 .....	41
Figure 23 Number of Cases and Incidence Rate of Shiga toxin E. coli, Shelby County, TN, 2003-2013.....	42
Figure 24 Shiga toxin-producing E. coli Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013 .....	42
Figure 25 Number of Cases and Incidence Rate of Salmonella, Shelby County, TN, 2003-2013 .....	44

Figure 26 Salmonellosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013..... 44

Figure 27 Percent of Salmonella cases by age group, Shelby County, 2013 ..... 45

Figure 28 Number of Cases and Incidence Rate of Shigella, Shelby County, TN, 2003-2013 ..... 46

Figure 29 Shigellosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013 ..... 46

Figure 30 Percent of Shigella cases by age group, Shelby County, 2013 ..... 47

Figure 31 Distribution of influenza positive tests over the 2013-2014 influenza season ..... 48

Figure 32 Number of Cases and Incidence Rate of Legionellosis, Shelby County, TN, 2003-2013 ..... 49

Figure 33 Legionellosis Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2003-2013 ..... 50

Figure 34 Epi Curve for Confirmed Cases of Legionellosis in 2013, Shelby County ..... 52

Figure 35 Number of Cases and Incidence Rate of Confirmed Lyme Disease, Shelby County, TN, 2003-2013 ..... 55

Figure 36 Lyme Disease Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2003-2013 ..... 55

Figure 37 Number of Cases and Incidence Rate of Confirmed Spotted Fever Rickettsiosis, Shelby County, TN, 2003-2013..... 56

Figure 38 Spotted Fever Rickettsiosis Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2003-2013..... 57

Figure 39 Number and Rate of Infant Mortality, Shelby County, 2003-2013 ..... 60

Figure 40 Infant Mortality Rate by Race-Ethnicity, Shelby County, 2003-2013 ..... 61

Figure 41 Number and Rate of Preterm Births, Shelby County, 2003-2013 ..... 62

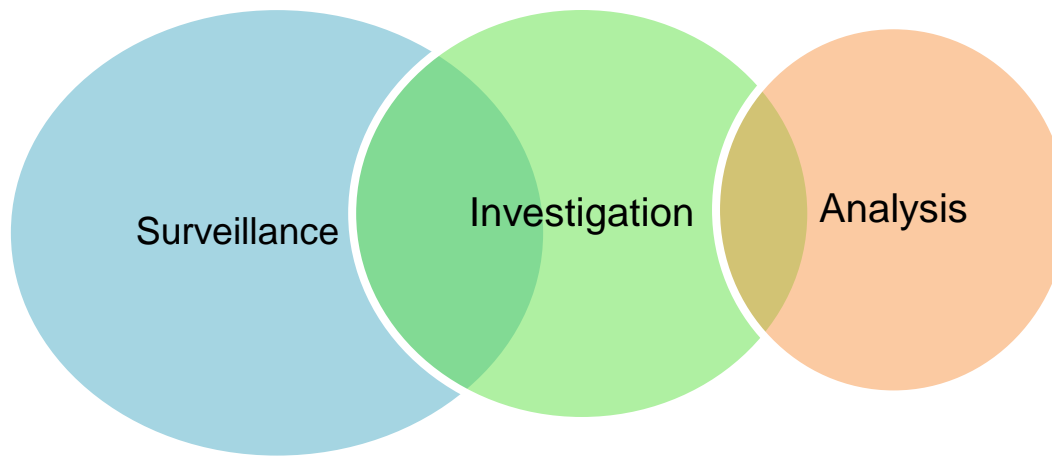
Figure 42 Preterm Birth Rate by Race-Ethnicity, Shelby County, 2003-2013 ..... 63

Figure 43 Number and Rate of Low Birth Weight Births, Shelby County, 2003-2013 ..... 64

Figure 44 Low Birth Weight Birth Rate by Race-Ethnicity, Shelby County, 2003-2013..... 65

Figure 45 Number and Rate of Teen Births, Shelby County, 2003-2013 ..... 66

Figure 46 Teen Fertility Rate by Race-Ethnicity, Shelby County, 2003-2013 ..... 67



## INTRODUCTION 3|THREE

The Office of Epidemiology and Infectious Disease Control for the Shelby County Health Department (SCHD) is responsible for many aspects of ensuring and protecting the health of Shelby County residents. This group investigates and implements control measures for all reportable diseases. Tuberculosis, HIV infection and the majority of sexually transmitted infections have specific dedicated programs and staff that monitor and control those diseases. The Office also monitors environmental issues and responds when necessary. This report focuses on the diseases and conditions that the Epidemiology Section within the Office of Epidemiology tracks and monitors, focusing on reportable infectious diseases other than TB, HIV and the Sexually Transmitted Infections.

A reportable disease is one that state, federal or international public health authorities have identified as being critical to collect information on and report about in order to monitor disease trends or implement control measures. It is required by law that all physicians, hospitals, laboratories or anyone knowing of a suspected case must report all cases to the SCHD. There are categories of reportable diseases that signify severity and level of public health threat to the community. The categories are ordered as 1 through 5:

Category 1A- must be reported immediately (within 24 hours) over the phone to the SCHD Epidemiology Section.

Category 1B- Must be reported the next business day over the phone.

Category 2- Must be reported within 1 week of being suspected or diagnosed.

Category 3- Must be reported within 1 week of diagnosis but require special confidential reporting methods due to the nature of the disease (e.g. sexually transmitted infections and HIV/AIDS).

Category 4- Must be reported monthly and no later than 15 days following the end of the month.

Category 5- Must be reported monthly and no later than 30 days following the end of the month through the National Healthcare Safety Network.

The Epidemiology Section routinely monitors and investigates Categories 1 and 2 reportable diseases. Categories 3 and 4 diseases are managed by different sections of the Shelby County Health Department. Category 5 diseases, which are hospital acquired infections (HAI), are reported directly from hospitals to the State Department of Health's HAI division.

The Epidemiology Section investigates Category 1 and 2 diseases in order to ensure the public's health through proper identification and follow-up of those who are ill. The public health nurses within the section ensure that people who are ill receive the proper treatment for their disease. They investigate the contacts of the sick person in order to make sure that those who have come in contact with a sick person receive the appropriate vaccine, treatment, quarantine, and education necessary for the particular disease. These



measures are necessary to stop outbreaks that may occur from spreading. Several of the reportable diseases listed on pages 11-13 are spread through food and water; others are spread through person to person contact.

The Epidemiology Section also provides educational information to the public and other agencies on the nature, cause, spread, and control of both reportable and non-reportable infectious diseases as needed. Educational materials may include fact sheets and web updates about specific diseases; brochures or presentations regarding safe food handling, proper hand washing procedures and other disease prevention measures.

Foodborne and waterborne illnesses that are investigated by the SCHD Epidemiology Section include *Salmonella*, *E. coli* O157:H7, *Legionella*, *Listeria*, *Shigella*, *Yersinia*, *Vibrio* infections, *Cryptosporidiosis* and *Campylobacter* infections. Cases of these illnesses are usually identified through physicians' offices or other health care facilities, reports from individual institutions, reports from sick individuals, laboratory reports and other health departments. Reports of foodborne illness may involve restaurants, schools, churches, long-term care facilities or day care centers. During an investigation of a foodborne or waterborne illness, the Epidemiology section works closely with the Environmental Health Services and Laboratory sections of the Health Department to ensure correction of any problems involving food handling procedures and sanitation. The Environmental Health Services section may assist with visits to facilities for inspections and collection of patient specimens and environmental samples. The Laboratory section may assist in testing these specimens to confirm the causative agent. Together with these sections, the Epidemiology section monitors, investigates and responds to reports of foodborne and waterborne illness in the county.

Along with diseases, the Epidemiology section also monitors environmental health including carbon monoxide and lead poisoning. The temporal and geographic distributions of cases are analyzed to see if any commonalities are found. Educational information is distributed to physicians and the public to prevent future cases. Cases are usually identified through physicians' offices, ER departments, reports from sick individuals and laboratory reports. During an investigation of an environmental issue, the Epidemiology section works closely with the Environmental Health Services and Laboratory sections of the Health Department and the Environmental Epidemiology section of the Tennessee Department of Health.

The following represents highlights from 2013 in Shelby County:

- Enteric Illnesses
  - Salmonellosis was the most reported enteric disease with 134 cases.
  - Incidence of *Campylobacter* cases in 2013 met the 2020 National Health Objective, which is part of a program launched by the Department of Health and Human Services with goals to attain high-quality, longer lives free of preventable diseases, achieve health equity, eliminate disparities, create social and physical environments that promote good health for all, and to promote quality of life across all life stages.
- Vaccine Preventable Illnesses
  - There were no cases of mumps, measles, rubella, or diphtheria in 2013.
- Bacterial Invasive Diseases
  - There were 488 confirmed cases of bacterial invasive diseases in 2013.
  - Cases of Meningococcal disease, MRSA, invasive Strep A, and Strep IPD decreased in 2013.
- Outbreaks
  - Legionellosis outbreak in a gym led to 9 cases.

## Acknowledgments

The Epidemiology Section acknowledges and appreciates the support of our partners in finding cases of reportable diseases and their assistance with implementing appropriate control and response measures. The physicians, laboratorians, nurses, infection control practitioners, and other allied health professionals in Shelby County who report these cases to us are vital for alerting us about emerging outbreaks or changing disease patterns. Our public health partners in the Tennessee Department of Health and the other county and local health departments in the state, as well as our partners in neighboring states and federal agencies like the U.S. Centers for Disease Control and Prevention, help us understand disease patterns and trends affecting our region and the country as a whole.

Finally, we wish to acknowledge our internal partners within the Shelby County Health Department, particularly our partners in the Tuberculosis Elimination Program, the Infectious Diseases Section, and the Bureau of Environmental Health Services. These partners provide vital response efforts and control measures on a wide variety of health issues affecting the citizens of Shelby County and often assist when the Epidemiology Section notices trends or emerging issues when monitoring data streams and case reports. Protecting the public health of our community is always a team effort, requiring the collaboration of multiple disciplines and the expertise of many people.

## **Data Interpretation**

The data used in this report are gathered through investigations of disease occurrences in Shelby County, which are reported to SCHD's Epidemiology section by health-care providers, laboratories, and other public health personnel. The data are managed and stored in the National Electronic Disease Surveillance System (NEDSS).

In the United States, requirements for reporting diseases are mandated by state laws or regulations, and the list of reportable diseases in each state differs. The Centers for Disease Control and Prevention (CDC), in collaboration with the Council of State and Territorial Epidemiologists, published case definitions for public health surveillance in October of 1999 and update them regularly with new information. This document provided uniform criteria for reporting cases throughout the State and nation. The document is updated periodically based on emerging infections around the country.

The case definitions vary by disease. All disease reports are assigned one of the following statuses based on the disease presentation and laboratory testing conducted. A tiered system with the following level is used:

- Suspect/possible case: indicative clinical picture without being confirmed or probable case.
- Probable case: there is a clear clinical picture, or an epidemiological link to a confirmed case. An epidemiological link is a case that either has been exposed to a confirmed case, or has had the same exposure as a confirmed case, such as eating or drinking the same food or water, having the same sexual contacts, attending the same daycare, etc.
- Confirmed case: A confirmed case has the appropriate clinical characteristics and is verified by laboratory analysis.
- Not a case: This status is assigned when none of the above criteria is met.

Unless specifically stated, only symptomatic cases are to be reported. Asymptomatic infections are to be regarded as cases, however, if the infections have therapeutic or public health implications.

The case definitions are important to assist in properly investigating and classifying diseases. Moreover, the case definitions facilitate interpretation of data of these diseases.

Data presented in this report are limited to number and rate of all reported and confirmed cases. All reported cases include confirmed, probable, suspect and not a case reports.

The number of reports is simply the counts of reportable diseases received over the period of time. The incidence rate is the frequency of reports per every one hundred thousand population.

Tennessee disease data was provided by the Tennessee Department of Health Communicable Disease Interactive Data website, located at <http://health.state.tn.us/Ceds/WebAim/>. Population estimates were gathered from US Census data. Disease descriptions were collected from the Tennessee Department of Health Reportable Disease website and the CDC website. Lead poisoning data was provided by the Shelby County Childhood Lead Poisoning Prevention Program.

## LIST OF REPORTABLE DISEASES AND CONDITIONS IN TENNESSEE, 2013

### Category 1A: Requires immediate telephonic notification (24 hours a day, 7 days a week), followed by a written report using the PH-1600 within 1 week.

- [002] Anthrax (*Bacillus anthracis*)<sup>B</sup>
- [005] Botulism-Foodborne (*Clostridium botulinum*)<sup>B</sup>
- [004] Botulism-Wound (*Clostridium botulinum*)
- [505] Disease Outbreaks (e.g., foodborne, waterborne, healthcare, etc.)
- [023] Hantavirus Disease
- [096] Measles-Imported
- [026] Measles-Indigenous
- [095] Meningococcal Disease (*Neisseria meningitidis*)
- [516] Novel Influenza A
- [032] Pertussis (Whooping Cough)
- [037] Rabies: Human
- [112] Ricin Poisoning<sup>B</sup>
- [132] Severe Acute Respiratory Syndrome (SARS)
- [107] Smallpox<sup>B</sup>
- [110] Staphylococcal Enterotoxin<sup>B</sup> (SE<sup>B</sup>) Pulmonary Poisoning<sup>B</sup>
- [111] Viral Hemorrhagic Fever<sup>B</sup>

### Category 1B: Requires immediate telephonic notification (next business day), followed by a written report using the PH-1600 within 1 week.

- [006] Brucellosis (*Brucella* species)<sup>B</sup>
- [502] *Burkholderia mallei* infection<sup>B</sup>
- [010] Congenital Rubella Syndrome
- [011] Diphtheria (*Corynebacterium diphtheriae*)
- [123] Encephalitis, Arboviral: Eastern Equine
- [507] *Francisella* species infection (other than *F. tularensis*)<sup>B</sup>
- [053] Group A Streptococcal Invasive Disease (*Streptococcus pyogenes*)
- [047] Group B Streptococcal Invasive Disease (*Streptococcus agalactiae*)
- [054] *Haemophilus influenzae* Invasive Disease
- [016] Hepatitis, Viral-Type A acute
- [513] Influenza-associated deaths, age <18 years
- [520] Influenza-associated deaths, pregnancy-associated
- [515] Melioidosis (*Burkholderia pseudomallei*)
- [102] Meningitis-Other Bacterial
- [031] Mumps
- [033] Plague (*Yersinia pestis*)<sup>B</sup>
- [035] Poliomyelitis-Nonparalytic
- [034] Poliomyelitis-Paralytic
- [119] Prion disease-variant Creutzfeldt Jakob Disease
- [109] Q Fever (*Coxiella burnetii*)<sup>B</sup>
- [040] Rubella
- [041] Salmonellosis: Typhoid Fever (*Salmonella typhi*)
- [131] *Staphylococcus aureus*: Vancomycin non-sensitive – all forms
- [075] Syphilis (*Treponema pallidum*): Congenital
- [519] Tuberculosis, confirmed and suspect cases of active disease (*Mycobacterium tuberculosis* complex)
- [113] Tularemia (*Francisella tularensis*)<sup>B</sup>
- [108] Venezuelan Equine Encephalitis Virus Infection<sup>B</sup>

### Category 2: Requires written report using form PH-1600 within 1 week.

- [528] *Acinetobacter* species, Carbapenem-resistant (Davidson County residents only)
- [501] Babesiosis
- [003] Botulism-Infant (*Clostridium botulinum*)
- [121] California/LaCrosse Serogroup Virus Infection
- [007] Campylobacteriosis (including EIA or PCR positive stools)

[503] Chagas Disease  
 [069] Chancroid  
 [055] *Chlamydia trachomatis*-Genital  
 [057] *Chlamydia trachomatis*-Other  
 [009] Cholera (*Vibrio cholerae*)  
 [001] Cryptosporidiosis (*Cryptosporidium* species)  
 [106] Cyclosporiasis (*Cyclospora* species)  
 [504] Dengue Fever  
 [522] Ehrlichiosis/Anaplasmosis- Any  
 [506] Enterobacteriaceae, Carbapenem-resistant  
 [060] Gonorrhea-Genital (*Neisseria gonorrhoeae*)  
 [064] Gonorrhea-Ophthalmic (*Neisseria gonorrhoeae*)  
 [061] Gonorrhea-Oral (*Neisseria gonorrhoeae*)  
 [062] Gonorrhea-Rectal (*Neisseria gonorrhoeae*)  
 [133] Guillain-Barré syndrome  
 [058] Hemolytic Uremic Syndrome (HUS)  
 [480] Hepatitis, Viral-HbsAg positive infant  
 [048] Hepatitis, Viral-HbsAg positive pregnant female  
 [017] Hepatitis, Viral-Type B acute  
 [018] Hepatitis, Viral-Type C acute  
 [021] Legionellosis (*Legionella* species)  
 [022] Leprosy [Hansen's Disease] (*Mycobacterium leprae*)  
 [094] Listeriosis (*Listeria* species)  
 [024] Lyme Disease (*Borrelia burgdorferi*)  
 [025] Malaria (*Plasmodium* species)  
 [521] Powassan virus infection  
 [118] Prion disease-Creutzfeldt Jakob Disease  
 [036] Psittacosis (*Chlamydia psittaci*)  
 [105] Rabies: Animal  
 [122] St. Louis Encephalitis Virus Infection  
 [042] Salmonellosis: Other than S. Typhi (*Salmonella* species)  
 [517] Shiga-toxin producing *Escherichia coli*  
 (including Shiga-like toxin positive stools, *E. coli* O157 and *E. coli* non-O157)  
 [043] Shigellosis (*Shigella* species)  
 [039] Spotted Fever Rickettsiosis (*Rickettsia* species including Rocky Mountain Spotted Fever)  
 [130] *Staphylococcus aureus*: Methicillin resistant Invasive Disease  
 [518] *Streptococcus pneumoniae* Invasive Disease (IPD)  
 [074] Syphilis (*Treponema pallidum*): Cardiovascular  
 [072] Syphilis (*Treponema pallidum*): Early Latent  
 [073] Syphilis (*Treponema pallidum*): Late Latent  
 [077] Syphilis (*Treponema pallidum*): Late Other  
 [076] Syphilis (*Treponema pallidum*): Neurological  
 [070] Syphilis (*Treponema pallidum*): Primary  
 [071] Syphilis (*Treponema pallidum*): Secondary  
 [078] Syphilis (*Treponema pallidum*): Unknown Latent  
 [044] Tetanus (*Clostridium tetani*)  
 [045] Toxic Shock Syndrome: Staphylococcal  
 [097] Toxic Shock Syndrome: Streptococcal  
 [046] Trichinosis  
 [101] Vancomycin resistant enterococci (VRE) Invasive Disease  
 [114] *Varicella* deaths  
 [104] Vibriosis (*Vibrio* species)  
 [125] West Nile virus Infections-Encephalitis  
 [126] West Nile virus Infections-Fever  
 [124] Western Equine Encephalitis Virus Infection  
 [098] Yellow Fever  
 [103] Yersiniosis (*Yersinia* species)

**Category 3: Requires special confidential reporting to designated health department personnel within 1 week.**

[500] Acquired Immunodeficiency Syndrome (AIDS)

[512] Human Immunodeficiency Virus (HIV)

[525] All CD4+ T-cell and HIV-1 Viral Load testing results from those laboratories performing these tests

**Category 4: Laboratories and physicians are required to report all blood lead tests. Levels  $\geq 5\mu\text{g/dl}$  should be reported within 1 week. Levels  $<5\mu\text{g/dl}$  should be reported within 1 month.**

[514] Lead Levels (blood)

**Category 5: Events will be reported monthly (no later than 30 days following the end of the month) via the National Healthcare Safety Network (NHSN - see <http://health.state.tn.us/ceds/hai/index.htm> for more details); *Clostridium difficile* infections (Davidson County residents only) will also be reported monthly to the Emerging Infections Program (EIP).**

[523] Healthcare Associated Infections, Catheter Associated Urinary Tract Infections

[508] Healthcare Associated Infections, Central Line Associated Bloodstream Infections

[509] Healthcare Associated Infections, *Clostridium difficile*

[524] Healthcare Associated Infections, Dialysis Events

[529] Healthcare Associated Infections, Healthcare Personnel Influenza Vaccination

[510] Healthcare Associated Infections, Methicillin resistant *Staphylococcus aureus* positive blood cultures

[511] Healthcare Associated Infections, Surgical Site Infections

[527] Neonatal Abstinence Syndrome

---

<sup>B</sup> Possible Bioterrorism Indicators



Table 1 Shelby County and Tennessee Population Estimates, 2000-2013

Year	Shelby County	Tennessee
2000	898,279	5,703,243
2001	899,543	5,755,443
2002	902,605	5,803,306
2003	906,280	5,856,522
2004	908,922	5,916,762
2005	912,418	5,995,748
2006	919,179	6,089,453
2007	919,964	6,172,862
2008	919,137	6,240,456
2009	920,232	6,296,254
2010	928,808	6,356,683
2011	933,902	6,398,361
2012	939,877	6,454,914
2013	939,465	6,495,978

Table 2 Shelby County Population by Age Group, Gender, Race, 2013

Shelby County Population by Age Group, Gender, Race, 2013			
Age Group	0 to 4	68,029	
	5 to 9	66,007	
	10 to 14	66,228	
	15 to 19	66,787	
	20 to 24	71,413	
	25 to 29	67,900	
	30 to 34	65,056	
	35 to 39	58,965	
	40 to 44	62,655	
	45 to 49	61,115	
	50 to 54	65,184	
	55 to 59	62,767	
	60 to 64	52,135	
	65 to 69	36,778	
	70 to 74	24,412	
	75 to 79	17,187	
	80 to 84	12,966	
	85+	13,881	
Gender	Female	Male	
	491,565	447,900	
Race	White	Black	Other
	403,700	486,358	37,586

Table 3 Confirmed Cases of Reportable Diseases in Shelby County, 2003-2013

Condition	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total
Campylobacteriosis	39	36	26	65	60	57	56	51	57	76	61	584
Cryptosporidiosis	1	4	8	6	2	10	8	2	2	1	7	51
Group A Streptococcal Invasive Disease (Streptococcus pyogenes)	35	18	21	25	26	29	32	41	30	28	26	311
Group B Streptococcal Invasive Disease (Streptococcus agalactiae)	62	66	104	115	68	71	84	71	76	59	68	844
Haemophilus Influenza Invasive Disease	12	7	14	13	15	20	26	14	18	16	17	172
Hepatitis, Viral-Type A acute	25	8	5	9	11	4	2	1	1	4	2	72
Hepatitis, Viral-Type B acute	60	39	41	24	31	19	38	31	18	18	22	341
Hepatitis, Viral-Type C acute	0	0	1	0	0	0	2	0	0	0	0	3
Legionellosis	0	1	0	4	5	6	10	17	23	12	32	49
Listeriosis	0	2	0	4	1	2	4	3	0	1	1	1
Lyme Disease	6	2	1	1	6	1	2	2	0	0	0	21
Malaria	0	0	0	0	0	0	0	0	0	1	3	4
Neisseria Meningitis	6	3	4	2	3	4	1	3	0	2	0	28
Mumps	2	0	0	1	0	0	1	0	0	0	0	4
Pertussis	8	3	14	6	9	12	13	29	3	14	18	129
Rocky Mountain Spotted Fever	7	0	0	1	1	1	0	0	0	0	0	10
Salmonellosis: Other than S. Typhi	164	105	170	143	134	146	137	214	194	178	126	1,711
Shiga toxin-producing Escherichia coli (STEC)	0	0	0	6	13	2	3	8	5	6	6	49
Shigellosis	152	29	9	127	44	100	55	154	132	97	81	980
Staphylococcus aureus: Methicillin resistant Invasive Disease	0	243	534	552	477	439	347	321	205	266	241	3,625
Streptococcus Pneumoniae Invasive Disease (IPD)	0	0	0	0	0	0	0	89	86	115	97	387
Vancomycin resistant enterococci (VRE) Invasive Disease	218	86	122	210	121	93	72	58	29	23	39	1,071
Vibriosis		0	0	0	0	1	1	1	1	1	2	7
West Nile virus neuroinvasive disease*	11	11	10	11	3	8	1	2	9	8	7	81
West Nile virus non-neuroinvasive disease*	1	1	3	3	2	2	4	0	2	7	2	27
Yersiniosis		7	9	9	1	4	2	6	3	6	1	48
<b>Total</b>	<b>809</b>	<b>668</b>	<b>1,096</b>	<b>1,329</b>	<b>1,027</b>	<b>1,023</b>	<b>887</b>	<b>1,115</b>	<b>871</b>	<b>925</b>	<b>859</b>	<b>10,610</b>

\*Includes confirmed and probable cases per CDC definition



Table 4 Confirmed/Probable Cases of Reportable Diseases in Shelby County by Age Group, 2013

	<1	1-4	5-9	10-14	15-19	20-24	25-34	35-44	45-54	55-64	65+	Unk	Total
<b>Campylobacteriosis</b>	2	7	3	2	2	1	10	8	11	7	8	0	<b>61</b>
<b>Carbapenem Producing Enterococci</b>	0	0	0	0	0	0	0	0	1	1	0	0	<b>2</b>
<b>Cryptosporidiosis</b>	0	2	0	1	0	2	1	1	0	0	0	0	<b>7</b>
<b>Group A Streptococcal Invasive Disease (Streptococcus pyogenes)</b>	0	2	1	0	0	4	1	3	2	5	8	0	<b>26</b>
<b>Group B Streptococcal Invasive Disease (Streptococcus agalactiae)</b>	12	1	0	0	0	2	2	6	7	14	24	0	<b>68</b>
<b>Haemophilus Influenza Invasive Disease</b>	0	1	0	0	0	0	2	1	1	3	8	0	<b>16</b>
<b>Hepatitis, Viral-Type A acute</b>	0	0	0	0	0	0	0	0	1	1	0	0	<b>2</b>
<b>Hepatitis, Viral-Type B acute</b>	0	0	0	0	0	3	10	9	0	0	0	0	<b>22</b>
<b>Hepatitis, Viral-Type B Chronic</b>	0	1	1	1	5	43	117	95	61	63	19	0	<b>406</b>
<b>Hepatitis, Viral-Type C Chronic</b>	0	0	0	0	0	2	7	12	31	46	13	0	<b>111</b>
<b>Legionellosis</b>	0	0	0	0	1	0	0	5	6	10	10	0	<b>32</b>
<b>Listeriosis</b>	0	0	0	0	0	0	0	0	0	1	0	0	<b>1</b>
<b>MRSA</b>	10	1	3	2	0	9	12	16	45	54	89	0	<b>241</b>
<b>Malaria</b>	0	0	0	0	0	0	1	0	0	2	0	0	<b>3</b>
<b>Meningitis Neisseria</b>	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>
<b>Pertussis</b>	16	0	0	2	1	0	0	2	3	5	1	0	<b>30</b>
<b>Shiga toxin-producing Escherichia coli (STEC)</b>	1	4	0	0	0	0	1	0	0	0	0	0	<b>6</b>
<b>Salmonellosis</b>	23	22	13	6	4	3	5	10	9	14	17	0	<b>126</b>
<b>Shigellosis</b>	1	27	28	4	4	2	6	3	1	3	1	1	<b>81</b>
<b>Streptococcus Pneumoniae Invasive Disease (IPD)</b>	2	4	7	0	1	2	7	5	19	16	34	0	<b>97</b>
<b>Vancomycin resistant enterococci (VRE) Invasive Disease</b>	4	0	0	0	1	0	1	2	9	8	14	0	<b>39</b>
<b>Vibriosis (non-cholera Vibrio species infections)</b>	0	0	0	0	0	0	0	0	0	1	1	0	<b>2</b>
<b>West Nile Virus, Neuro Invasive*</b>	0	0	0	0	1	0	1	0	1	0	4	0	<b>7</b>
<b>West Nile Virus, non-Neuro Invasive*</b>	0	0	1	0	0	0	0	0	0	1	0	0	<b>2</b>
<b>Yersiniosis</b>	0	0	0	0	0	0	0	0	1	0	0	0	<b>1</b>
<b>Total</b>	<b>71</b>	<b>72</b>	<b>57</b>	<b>18</b>	<b>20</b>	<b>73</b>	<b>184</b>	<b>178</b>	<b>209</b>	<b>255</b>	<b>251</b>	<b>1</b>	<b>1,389</b>

## VACCINE PREVENTABLE DISEASES 4|FOUR

Vaccine-preventable diseases are infectious diseases for which effective vaccines exist. Examples of vaccine preventable diseases include: Hepatitis B, Tetanus, Pertussis, Diphtheria, Polio, Measles, Mumps, Rubella, Rotavirus, and Meningitis. A complete list of vaccine-preventable diseases is published on the Centers for Disease Control and Prevention website (<http://www.cdc.gov/vaccines/vpd-vac/vpd-list.htm>). The Advisory Committee on Immunization Practices (ACIP) publishes immunization schedules for persons from birth through 18 years of age.

It is important for parents to adhere to immunization recommendations for their children from birth to adulthood. This ensures that a large proportion of individuals are immune or less susceptible if they come in contact with an infectious individual. Vaccines have proven effective in preventing epidemics and outbreaks of diseases by reducing unnecessary illnesses, disabilities, and deaths among the population. Within the last two decades, the decline in the number of children being vaccinated has made the general population more susceptible to diseases such as Measles and Pertussis, which previously had been eliminated (Measles) in the United States except for imported cases.

Fortunately, most parents do vaccinate their children, and for many of these diseases, it is rare that any actual cases are diagnosed and reported to the Shelby County Health Department. Information about Hepatitis B and Influenza, both of which are also vaccine preventable diseases, will be discussed in other sections of the annual report.

In 2013, there were 29 confirmed and probable cases of Pertussis reported in Shelby County with an incidence rate of 1.9 confirmed cases per 100,000 persons (table 1). There were no suspect or confirmed cases of mumps reported in 2013. There were also no cases of Measles, Rubella or Diphtheria reported in 2013.

---

### MUMPS

#### *Summary of the Disease*

Mumps is a viral infection that is caused by the mumps virus, affecting the parotid glands (salivary glands). Up to half of people with mumps have very mild or no symptoms. Common symptoms include fever, headache, muscle aches, tiredness, and loss of appetite. There is no specific treatment; however it can be prevented with the MMR (Measles, Mumps, Rubella) vaccine. Before the vaccine, mumps was a common illness in infants and children. Now, however, it has become a rare disease in the United States.

It is transmitted from person to person by droplets of saliva or mucus from the mouth, nose, or throat of an infected person who coughs, sneezes, or talks. Symptomatic aseptic meningitis can occur in up to 10% of Mumps cases. Cases peak during the winter and spring seasons. The incubation period ranges from 12-25 days, with an average of about 16-18 days.

#### *Highlights*

A total of four confirmed Mumps cases were reported in Shelby County from 2003 to 2013, with two cases in 2003, one case in 2006 and one case in 2009. There have been no confirmed or probable Mumps cases reported in the past four years.

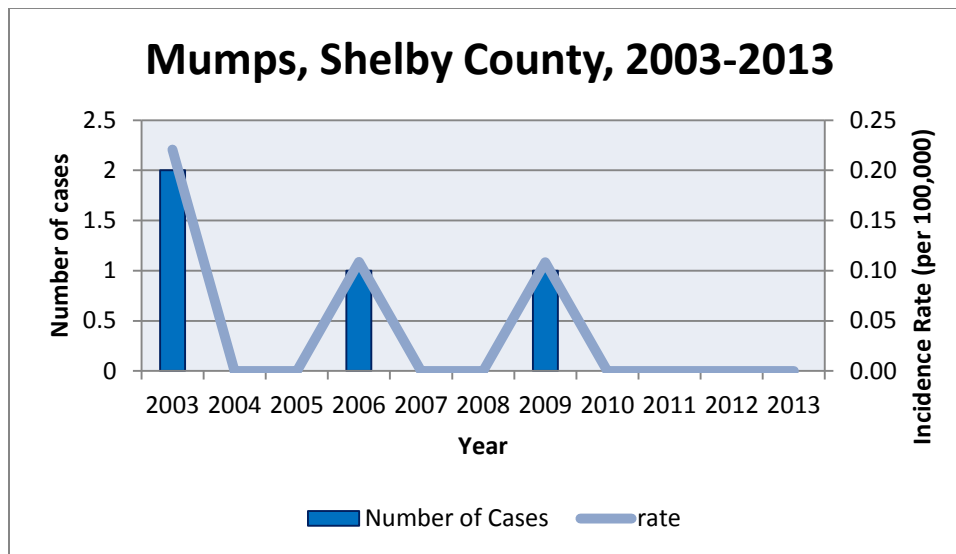


Figure 1 Number of Cases and Incidence Rate of Mumps, Shelby County, TN, 2003-2013

## PERTUSSIS

### Summary of the Disease

Pertussis, also known as whooping cough, is a respiratory disease caused by a type of bacteria called *Bordetella pertussis*. It is highly contagious and can cause serious illness, especially in infants who are young and not fully vaccinated. The vaccine is recommended for children beginning at 2 months of age, teens, and adults. The vaccine effectiveness decreases over time. Teens and adults should be revaccinated, even if fully vaccinated as a child. It is one of the most common vaccine-preventable diseases that occur in the United States.

Pertussis starts similar to a common cold, with runny nose or congestion, sneezing, and sometimes mild cough or fever. After 1–2 weeks, severe coughing can begin. Unlike the common cold, Pertussis can become a series of coughing fits that continues for weeks. Pertussis can cause violent and rapid coughing, over and over, until the air is gone from the lungs, and you are forced to inhale with a loud "whooping" sound. In infants, the cough can be minimal or not there at all. They may instead have life-threatening pauses in breathing (apnea).

Pertussis is spread from person to person while in close contact with others who breathe in the airborne pertussis bacteria. Many infants who get Pertussis are infected by parents, older siblings, or other caregivers who might not even know they have the disease. In 30-40% of infant infections, the infant is infected by the mother. Pertussis is more severe in infants less than one year old. Infants typically have pneumonia (lung infection) and slowed or stopped breathing.

The CDC defines a confirmed pertussis case as a cough illness lasting at least 2 weeks with one of the following: paroxysm (severe rapid cough) of coughing, inspiratory "whoop" or post-tussive vomiting, and without other apparent cause (as reported by a healthcare professional). In addition, a laboratory criterion for diagnosis is the isolation of *B. pertussis* from a clinical specimen, or positive polymerase chain (PCR) reaction assay for *B. pertussis*.

Table 5 Incidence of Pertussis, Shelby County, TN, 2013

<b>Number of Confirmed Cases for 2013</b>	18
<b>2013 incidence rate per 100,000</b>	1.9
<b>Age (yrs)</b>	
<b>Mean</b>	4.5 years
<b>Median</b>	2 months
<b>Min. - Max.</b>	23 days - 14 years

### Highlights

In 2013, there were 18 confirmed cases of Pertussis reported in Shelby County (Table 5) and an incidence rate of 1.9 confirmed cases per 100,000 persons. The age range of cases was 23 days to 14 years. Persons most affected are infants, with a median age of 4.5 years.

Figure 2 depicts the number of confirmed cases and incidence rate of Pertussis from 2003 to 2013 in Shelby County. A total of 129 cases were reported over this time period, and incidence has fluctuated. In 2010, there were 29 confirmed cases and an incidence rate of 3.1 per 100,000 persons, which is two times higher than any other year in the past decade except for 2013.

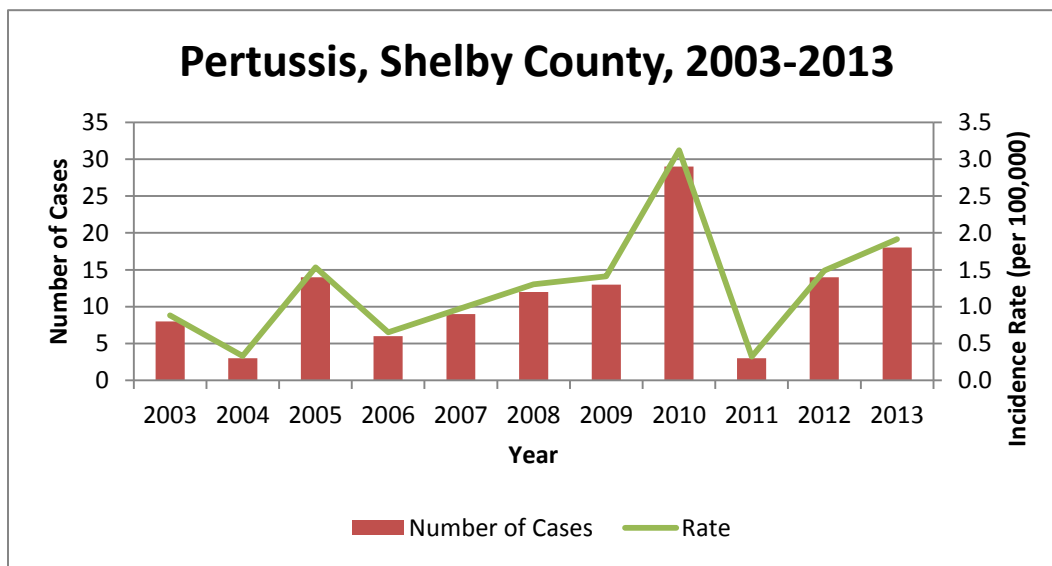


Figure 2 Number of Cases and Incidence Rate of Pertussis, Shelby County, TN, 2003-2013

Figure 3 shows the five-year average incidence rate of confirmed Pertussis cases for 2003-2007 and 2008-2012 in Shelby County and Tennessee, as well as the single-year 2013 incidence rate. The five-year average incidence rate increased in Shelby County (from 0.88 per 100,000 in 2003-2007 to 1.5 per 100,000 in 2008-2012) and at the state level (from 2.4 per 100,000 in 2003-2007 to 3.0 per 100,000 in 2008-2012). However, for both data points, the rate is less in Shelby County than it is statewide.

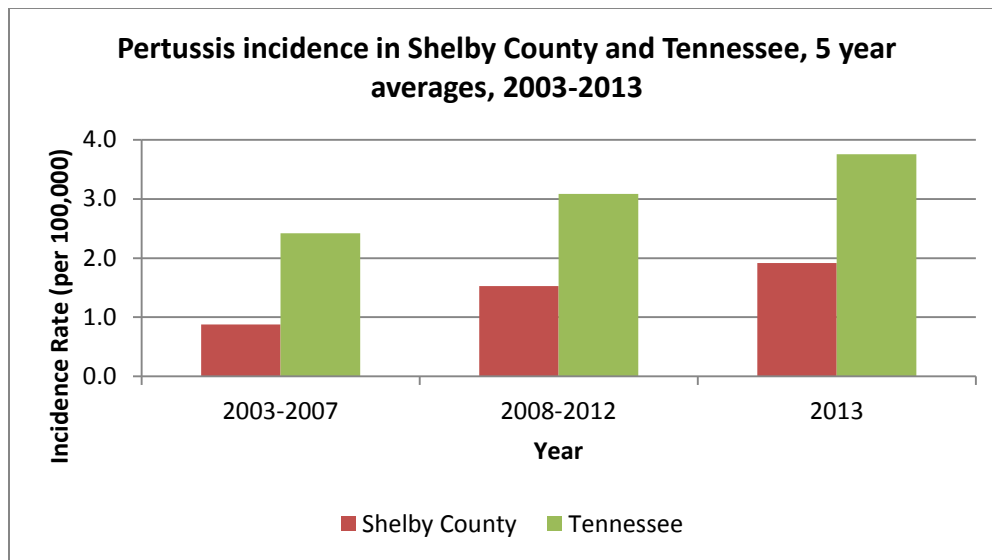


Figure 3 Pertussis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

Figure 4 shows the percentage of confirmed and probable Pertussis cases by age group in 2013. Based on the data, 53% occurred among children less than 1 years old. 30% of cases were diagnosed in adults > 45 years old. The best way for families to protect infants and small children from Pertussis is to ensure that the adults around the children are current on their vaccinations, particularly the Diphtheria, Tetanus and Pertussis (DTaP) vaccine.

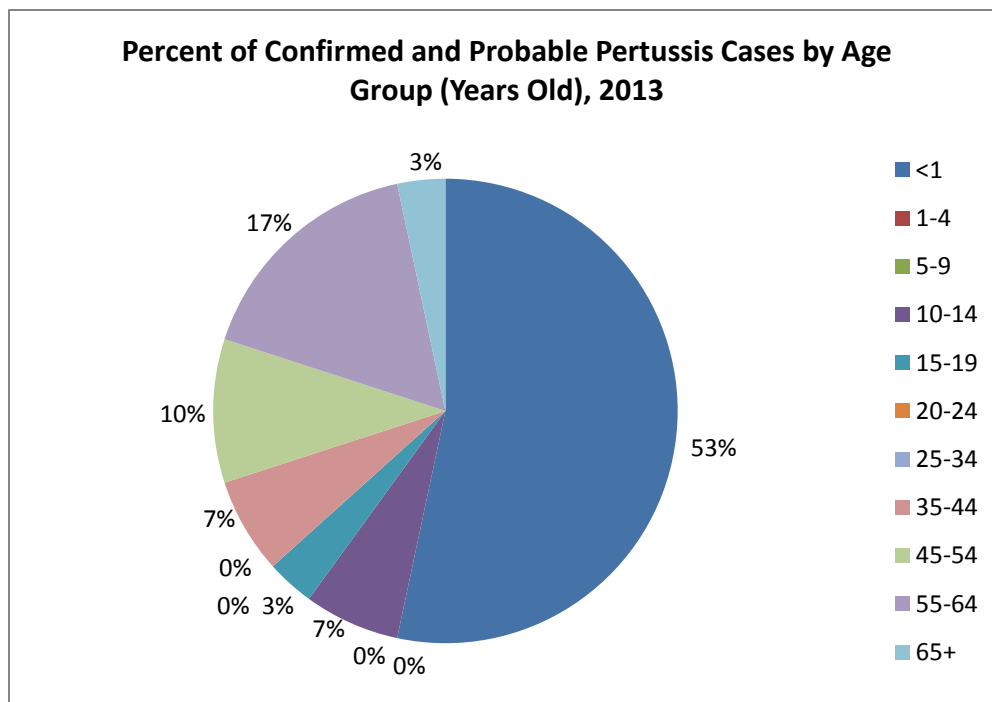


Figure 4 Percent of Pertussis Cases by Age Group, Shelby County, TN, 2013

The Hepatitis diseases reported in Shelby County in 2013 include the following: Hepatitis A acute, Hepatitis B acute and chronic, Hepatitis C acute and chronic and Hepatitis E acute. Hepatitis B chronic infection and Hepatitis C chronic infection are not reportable conditions. In 2013, there were 288 confirmed cases of Hepatitis diseases reported in Shelby County (table 6). Hepatitis diseases accounted for 2.7% of all reportable diseases in Shelby County for 2013, with Hepatitis B chronic and acute contributing the greatest numbers of confirmed cases.

Table 6 Incidence of Hepatitis in Shelby County, 2013

Reportable Disease	Case Status			
	Confirmed case	Not a case	Probable	Total
Hepatitis A, acute	2	43	0	45
Hepatitis B, acute	22	11	0	33
Hepatitis B, chronic	249	420	157	826
Hepatitis C, acute	0	49	0	49
Hepatitis C, chronic	15	301	96	412
Hepatitis E, acute	0	5	0	5
<b>Total</b>	288	829	253	1370
Frequency Missing = 1				

## HEPATITIS A

### *Summary of the Disease*

Hepatitis A is a contagious liver disease that results from infection with the Hepatitis A virus. It ranges in severity from a mild illness to a severe illness that can last several months. It is usually spread when a person unintentionally ingests fecal-contaminated objects, food, or drinks. It most often occurs in countries where personal hygiene or sanitary conditions are poor. According to the CDC, Hepatitis A still occurs in the US, though there has been a 90% decrease in Hepatitis A cases over the past 20 years. This is possible due to the introduction of the Hepatitis A vaccine. It is recommended for all children, some international travelers, and people with certain risk factors. It is given as two doses, 6 months apart. Both shots are needed for long-term protection.

Anyone can get Hepatitis A, but some people are at greater risk, including travelers to Hep A endemic countries, people who engage in sexual contact with someone who has Hep A, men who have sex with men, recreational drug users and house members of a person with Hep A. Although not everyone develops symptoms, common symptoms include fever, fatigue, vomiting, loss of appetite, nausea and abdominal pain. Symptoms are more likely to occur in adults and usually last less than 2 months.

### *Highlights*

In 2013 in Shelby County, there were only 2 confirmed cases of Hepatitis A. It is unknown whether or not these cases were imported.

## HEPATITIS B

### *Summary of the Disease*

Hepatitis B is a contagious liver disease that results from infection with the Hepatitis B virus. When first infected, a person can develop an “acute” infection, which refers to the first 6 months after someone is exposed. Acute Hepatitis B can range in severity

from a very mild illness with no or few symptoms to a serious condition requiring hospitalization. Some people fight off the infection and clear the virus while others develop “chronic” Hepatitis B, which is a lifelong infection. Fortunately, according to the CDC, the number of Hepatitis B acute cases has decreased more than 80% in the United States over the past 20 years, possibly due to widespread vaccination of children.

Hepatitis B is usually spread through blood, semen, or other body fluids. This can occur through sexual contact, sharing needles, or from an infected mother to her baby at birth. It is most commonly spread through sexual contact and is much more infectious than HIV, approximately 50-100 times more. Not everyone exhibits symptoms with acute Hepatitis B, but most adults have symptoms that appear within 3 months of first exposure. Symptoms can include fever, fatigue, loss of appetite, nausea, abdominal pain and vomiting.

Fortunately, Hepatitis B can be prevented through vaccination. All infants should be vaccinated at birth. Other people who should be vaccinated include, men who have sex with men, injection drug users, travelers to countries where Hepatitis B is endemic, people with HIV infection and anyone else who wants protection. The vaccination includes 3 intramuscular injections over 6 months.

**Table 7 Incidence of Hepatitis B acute infection, Shelby County, TN, 2013**

<b>Number of Confirmed Cases for 2013</b>	22
<b>2013 incidence rate per 100,000</b>	2.34
<b>Age (yrs)</b>	
<b>Mean</b>	32.8
<b>Median</b>	33.5
<b>Min. - Max.</b>	21 years- 44 years

**Table 8 Incidence of Hepatitis B chronic infection, Shelby County, TN, 2013**

<b>Number of Confirmed Cases for 2013</b>	249
<b>2013 incidence rate per 100,000</b>	26.5
<b>Age (yrs)</b>	
<b>Mean</b>	38.8
<b>Median</b>	36
<b>Min. - Max.</b>	4 years- 78 years

### *Highlights*

Only Hepatitis B acute infection is reportable in Tennessee. Hepatitis B acute infection incidence rates have decreased by 63% in Shelby County from 2003 to 2013 (figure 5). The Healthy People 2020 goal is to reduce new Hepatitis B cases among persons aged 2 to 18 years to 0.0 cases per 100,000 persons in that age range. Shelby County is on track to meet that goal.

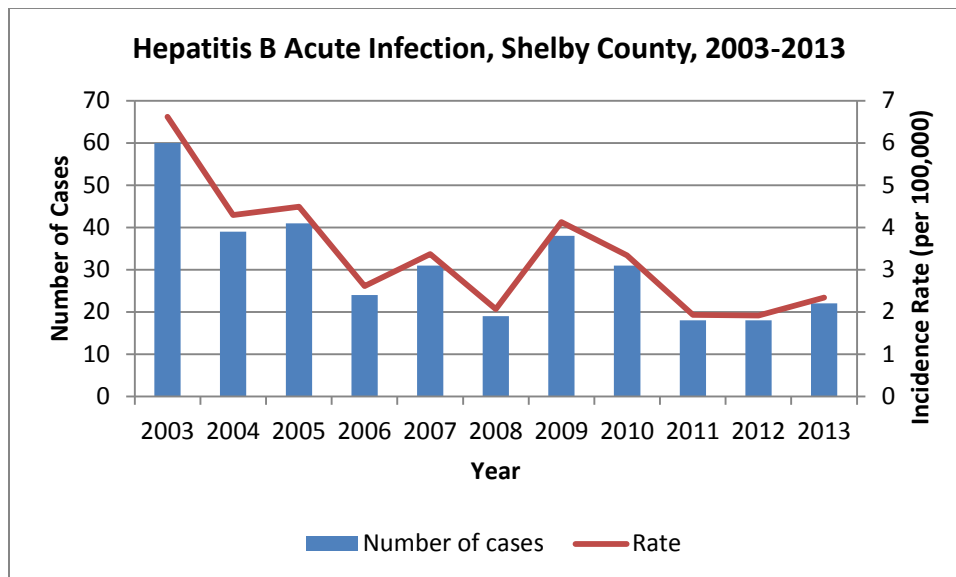


Figure 5 Number of Cases and Incidence Rate of Hepatitis B Acute Infection, Shelby County, TN, 2003-2013

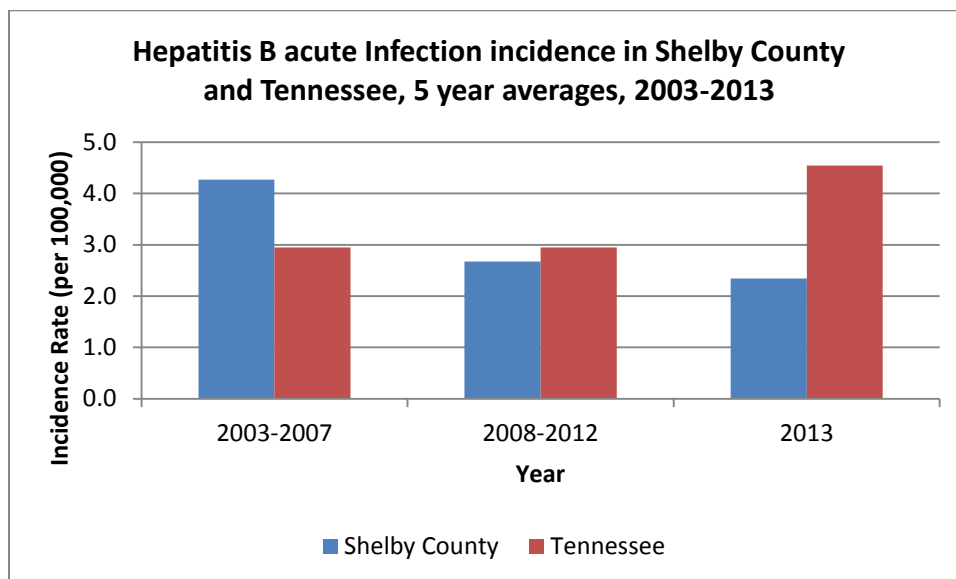


Figure 6 Hepatitis B acute Infection incidence in Shelby County and Tennessee, 5 year averages, 2003-2013

## HEPATITIS C

### *Summary of the Disease*

Hepatitis C is a contagious liver disease that results from infection with the Hepatitis C virus. It is primarily spread through contact with the blood of an infected person through sharing needles to inject drugs, needle stick injuries in health care settings, being born to a mother with Hepatitis C or having sexual contact with someone infected with Hepatitis C. Acute Hepatitis C infection is a short-term illness that occurs within the first 6 months after someone is exposed. For most people, infection with Hepatitis C leads to chronic infection.



Around 70%- 80% of people with acute Hepatitis C do not show symptoms. Common symptoms include fever, fatigue, nausea, vomiting, abdominal pain and dark urine. Symptoms usually occur 6-7 weeks after exposure but can range from 2 weeks to 6 months. Acute Hepatitis C can be treated, though infections can clear on their own without treatment in about 25% of people. There is no vaccine to prevent Hepatitis C.

### *Highlights*

In 2013, there were no confirmed cases of Hepatitis C acute infections in Shelby County. The 2020 Healthy People goal is to reduce new Hepatitis C infections to 0.25 new cases per 100,000. In 2013, Shelby County succeeded in reaching that goal with no new infections.

## BACTERIAL INVASIVE DISEASES 6|SIX

The bacterial invasive diseases reported in Shelby County in 2013 include the following: *Haemophilus Influenzae* (Invasive Disease), Meningococcal (*Neisseria meningitidis*) Infection, Invasive Group A Strep Disease, Invasive Group B Strep Disease, *Strep pneumoniae* Drug-Resistant (Invasive Disease) and VRE. In 2013, there were 488 confirmed cases of bacterial invasive diseases reported in Shelby County (table 9). Bacterial invasive diseases accounted for 56.8% of all confirmed reportable diseases in Shelby County for 2013, with invasive MRSA and *Streptococcus pneumoniae* infections contributing the greatest numbers of cases.

Table 9 Incidence of Bacterial Invasive Diseases in Shelby County, 2013

Reportable Disease	Case Status			
	Confirmed case	Not a case	Suspect	Total
Group A <i>Streptococcus</i>	26	4	0	30
Group B <i>Streptococcus</i>	68	12	0	80
<i>Haemophilus Influenza</i>	17	2	0	19
MRSA	241	37	0	278
Meningococcal ( <i>Neisseria meningitidis</i> ) Infection	0	0	0	0
<i>Streptococcus Pneumoniae</i> Invasive Disease (IPD)	97	2	0	99
VRE	39	0	0	39
<b>Total</b>	488	57	0	545
Frequency Missing = 1				

### HAEMOPHILUS INFLUENZA (INVASIVE DISEASE)

#### Summary of Disease

*Haemophilus influenza* is a severe bacterial infection that primarily affects infants. This infection is caused by six serotypes of *Haemophilus influenza* with type b (Hib) being the most significant for public health purposes. The invasive disease can cause various clinical syndromes such as meningitis, bacteremia or sepsis, epiglottitis, pneumonia, septic arthritis, osteomyelitis, empyema, and abscesses. The non-invasive Hib can produce mucosal infections such as bronchitis, sinusitis, and otitis. Symptom onset is often abrupt, and may include fever, headache, lethargy, anorexia, vomiting, nausea, and irritability. This infection is transmitted through direct contact with respiratory droplets from an infected person. Children less than 4 years old who have had prolonged household, daycare, or other close contact with an infected person are at increased risk of contracting the disease. The risk of secondary disease among household contacts is age dependent, with the youngest children being at greatest risk. In 2013, there were 17 confirmed cases of *Haemophilus influenza* in Shelby County (table 10).

Table 10 Incidence of Haemophilus Influenza in Shelby County, 2013

Number of Confirmed Cases for 2013	17
2013 incidence rate per 100,000	1.81
Age (yrs) Mean Median	57 65
Min. - Max.	1 year-94 years

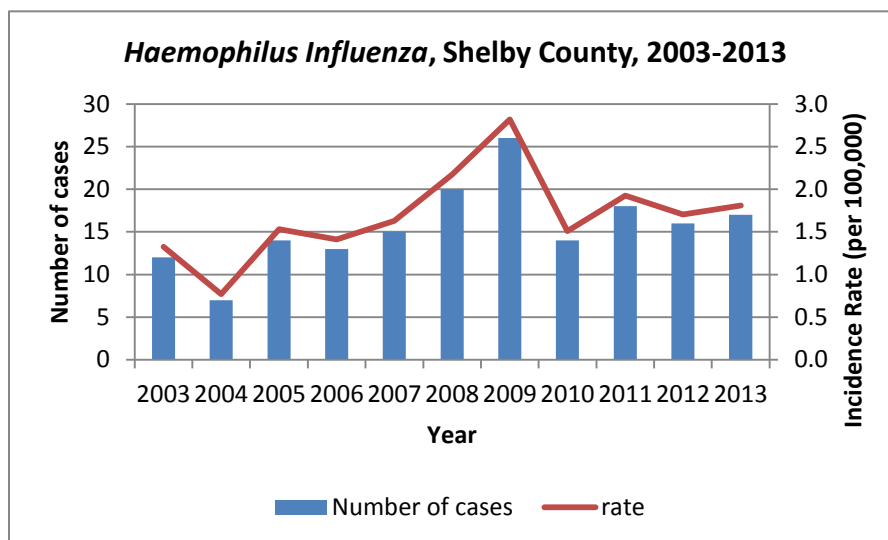


Figure 7 Number of Cases and Incidence Rate of *Haemophilus Influenza*, Shelby County, TN, 2003-2013

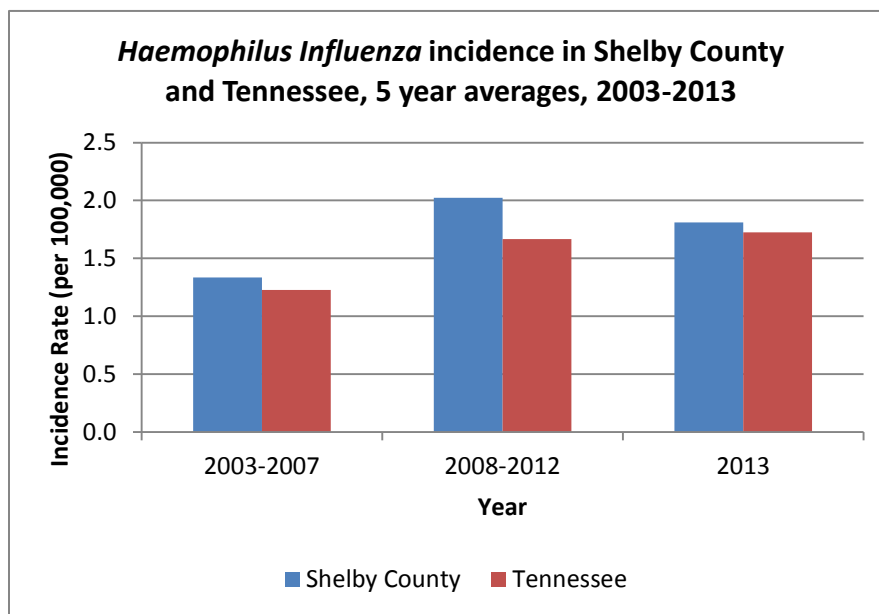


Figure 8 *Haemophilus Influenza* Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

## MENINGOCOCCAL (*NEISSERIA MENINGITIDIS*) INFECTION

### Summary of Disease

This infection is characterized by sudden onset of fever, intense headache, nausea, and often vomiting, stiff neck and frequently, a petechial rash. Delirium and coma are often associated with *Neisseria meningitidis*, otherwise known as bacterial meningitis. Bacterial meningitis has a high case fatality rate (50% or higher) when left untreated. With early diagnosis and treatment, the case fatality rate can be lowered to 5-15%. The infection is transmitted by direct contact with an infected person, including respiratory droplets from the nose and throat. Meningococci usually disappear from the nasopharynx within 24 hours after treatment with antibiotics. Approximately 25% of people in the general population are colonized with the bacteria, without causing illness or infection. There were no cases of *Neisseria meningitidis* in Shelby County in 2013.

### Highlights

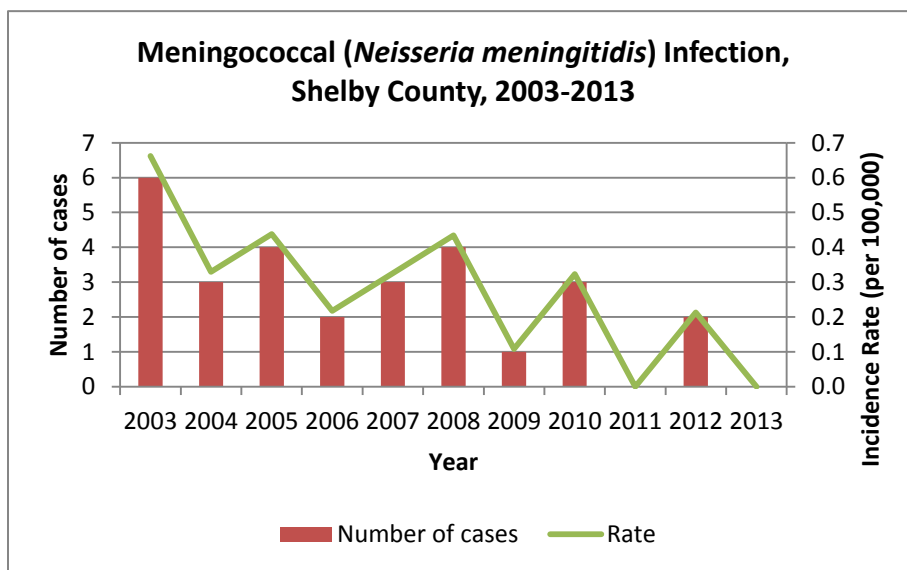


Figure 9 Number of Cases and Incidence Rate of *Neisseria meningitidis*, Shelby County, TN, 2003-2013

## METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)

### Summary of Disease

Methicillin-Resistant *Staphylococcus aureus* (MRSA) is a bacterial infection that is resistant to certain antibiotics called beta-lactams. About 5% of *S. aureus* bacterial strains are still susceptible to penicillin. The bacteria *staphylococcus* can either colonize or infect people. Colonization occurs when the bacteria is present on or in the body without causing illness. Infection occurs when the bacteria causes illness in the person. MRSA is mostly spread by direct physical contact. It not spread through the air. MRSA can also be spread indirectly when people come in contact with staphylococcus bacteria-contaminated objects, such as sheets, wound dressing, workout areas, towels, cloths and sports equipment. In 2013, there were 241 confirmed cases of MRSA infection in Shelby County (table 11).

Table 11 Incidence of Confirmed MRSA Infection in Shelby County, 2013

<b>Number of Confirmed Cases for 2013</b>	241
<b>2013 incidence rate per 100,000</b>	25.7
<b>Age (yrs)</b>	
<b>Mean</b>	56.5 years
<b>Median</b>	58 years
<b>Min. - Max.</b>	10 days-99 years

### Highlights

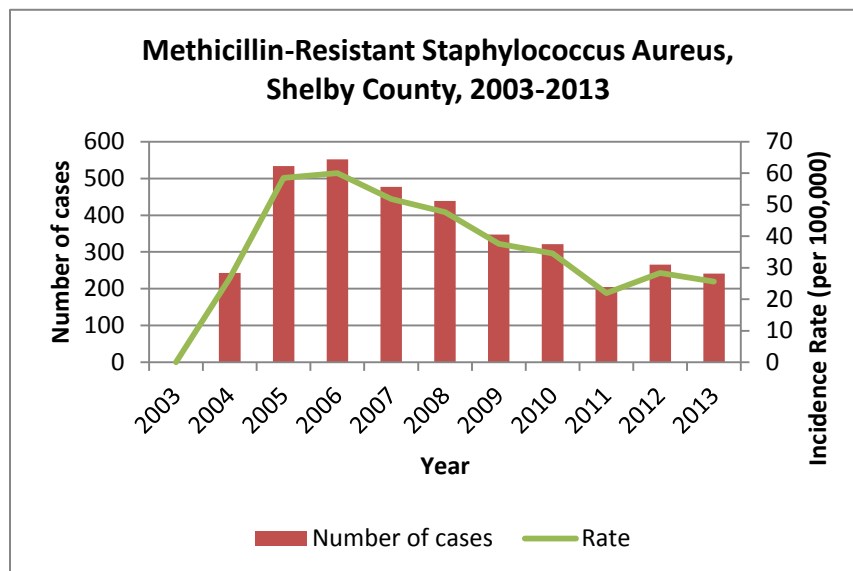


Figure 10 Number of Cases and Incidence Rate of Methicillin-Resistant Staphylococcus Aureus, Shelby County, TN, 2003-2013

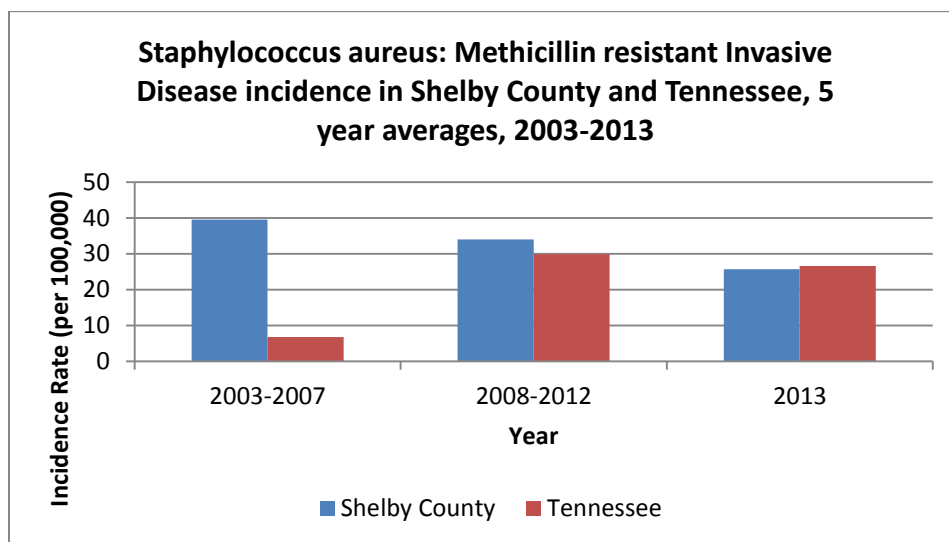


Figure 11 Methicillin-Resistant Staphylococcus aureus Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

## STREPTOCOCCAL DISEASE (INVASIVE GROUP A)

### Summary of Disease

Group A *Streptococcus* infections commonly cause non-invasive illnesses such as strep throat or impetigo. Invasive group A *Streptococcus* manifests in several clinical symptoms such as pneumonia, bacterial cutaneous infection, meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis, neonatal sepsis and nonfocal bacteremia. Two of the most severe, but least common, forms of invasive group A *Streptococcus* diseases are called necrotizing fasciitis (NF) and streptococcal toxic shock syndrome (STSS). According to the CDC, 10%-15% of those with invasive group A streptococci die from the infection, and approximately 25% of patients with NF and more than 35% with STSS die from the infection.

Group A *Streptococcus* is spread from person to person by contact with infectious secretions. The bacteria can be carried asymptomatically in the pharyngeal passage by all age groups, though it is commonly observed in children. Those who are nasal carriers of the infection are highly likely to spread the infections to others through direct contact. Antibiotics can limit the spread of infection. If left untreated, the infection is communicable for 10 to 21 days. The elderly, immunosuppressed persons, those with chronic cardiac or respiratory disease, diabetics and people with skin lesions are at high risk of contracting invasive group A *Streptococcus*. African Americans and American Indians are also high risk groups for invasive group A *Streptococcus*. In 2013, there were 26 confirmed cases of Invasive Group A strep in Shelby County (table 12).

Table 12 Incidence of Invasive Group A Streptococcal Infection in Shelby County, 2013

<b>Number of Confirmed Cases for 2013</b>	26
<b>2013 incidence rate per 100,000</b>	2.77
<b>Age (yrs)</b>	
<b>Mean</b>	47.7
<b>Median</b>	54
<b>Min. - Max.</b>	1 year- 92 years

### Highlights

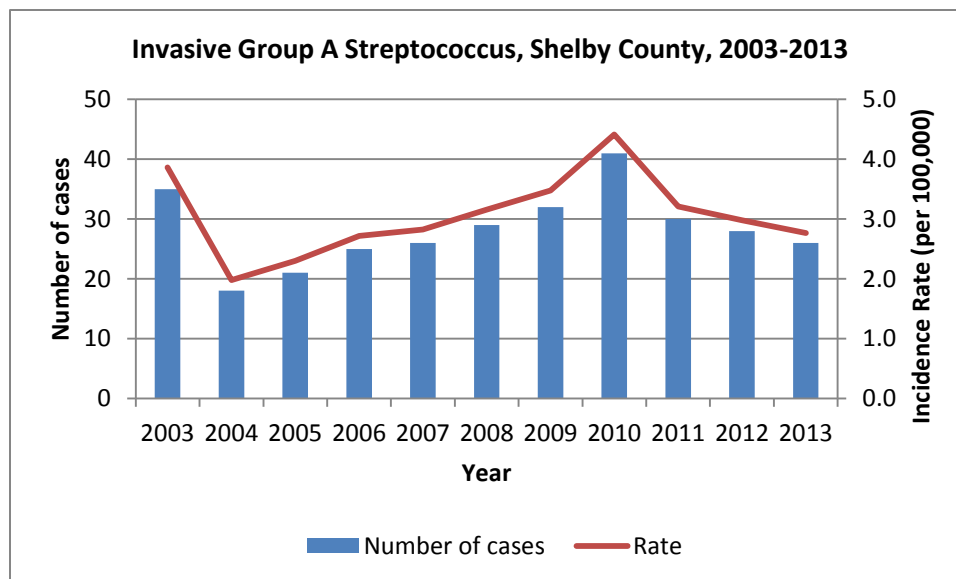


Figure 12 Number of Cases and Incidence Rate of Invasive Group A Strep, Shelby County, TN, 2003-2013

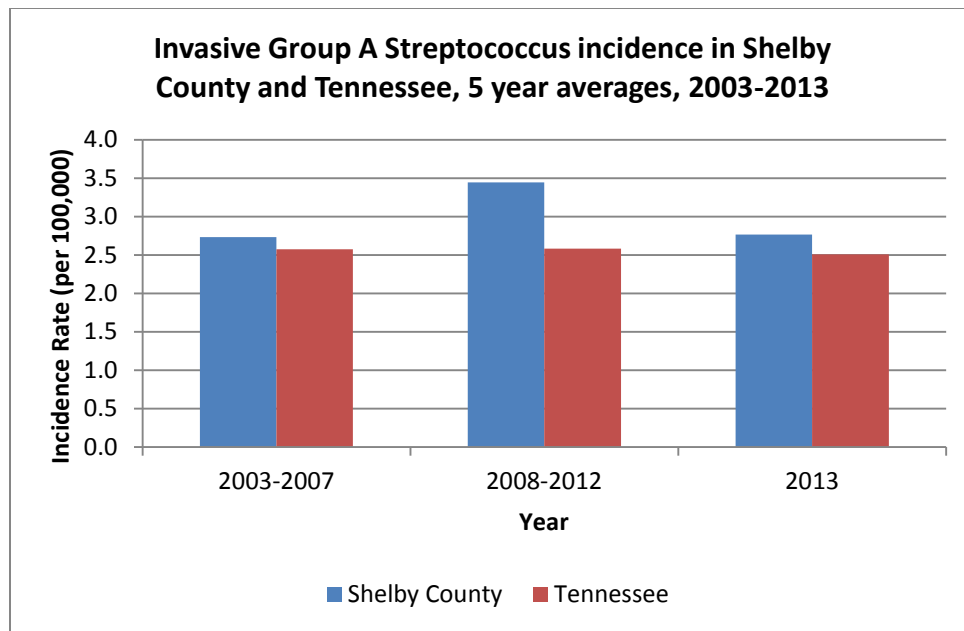


Figure 13 Invasive Group A Strep Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

## STREPTOCOCCAL DISEASE (INVASIVE GROUP B)

### Summary of Disease

According to the CDC, Group B *Streptococcus* is the most common cause of meningitis and pneumonia in newborns and blood infections. It is also a chief cause of perinatal bacterial infections in women about to deliver. Furthermore, group B *Streptococcus* is known to cause focal and systemic infections in infants from birth to over 3 months old. This disease can be invasive or non-invasive, depending on the age of the infant. The early onset invasive type of group B strep often occurs in the first 24 hours of life, and ranges from 0-6 days. This stage is characterized by systemic infection, respiratory distress, shock, pneumonia, apnea, and meningitis. Late onset types of group B strep infections normally happen at 3 to 4 weeks old and ranges from 7 days to 3 months. This stage is characterized by focal infections such as osteomyelitis, septic arthritis, adenitis and cellulitis. Also, meningitis or occult bacteremia might occur. Systemic infections in non-pregnant adults who have chronic diseases, such as diabetes, chronic liver or renal disease, or cancer are also common. In 2013, there were 68 confirmed cases of Invasive Group B strep in Shelby County (table 13).

Table 13 Incidence of Invasive Group B Streptococcal Infection in Shelby County, 2013

<b>Number of Confirmed Cases for 2013</b>	68
<b>2013 incidence rate per 100,000</b>	7.24
<b>Age (yrs)</b>	
<b>Mean</b>	50.2
<b>Median</b>	57
<b>Min. - Max.</b>	2 days-96 years

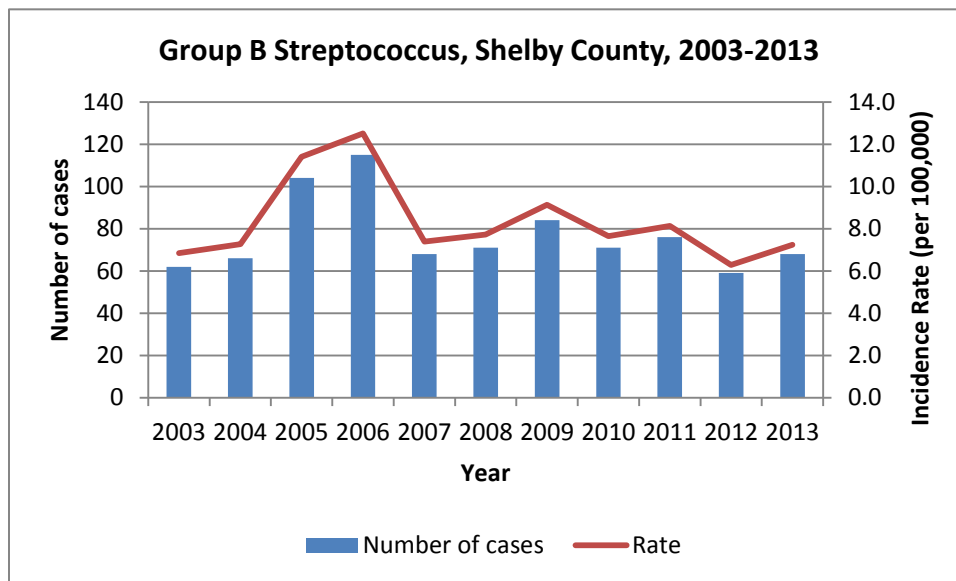


Figure 14 Number of Cases and Incidence Rate of Invasive Group B Strep, Shelby County, TN, 2003-2013

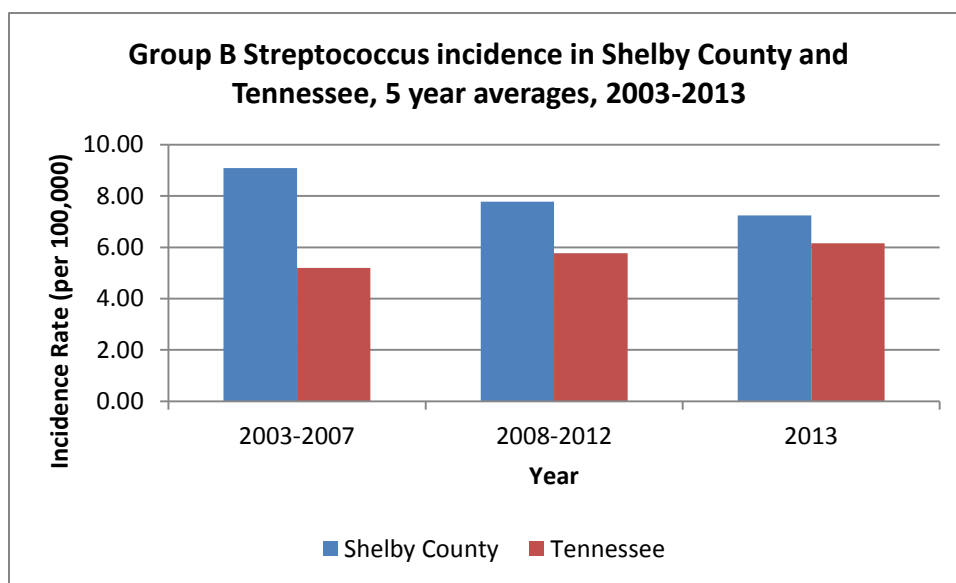


Figure 15 Invasive Group B Strep Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

## STREPTOCOCCUS PNEUMONIAE INVASIVE DISEASE (IPD)

### Summary of Disease

*Streptococcus pneumoniae* is a bacterial infection that affects different parts of the body and may either be invasive or non-invasive. The invasive infection is commonly found in early childhood years, though the number of cases is changing due to the new conjugate vaccine that was recently introduced. The signs and symptoms of invasive *Streptococcus pneumoniae* include bacteremia and



meningitis. *Streptococcus pneumoniae* is now the predominant cause of meningitis in children, since the decline of *Haemophilus influenza* type b infections, and became reportable in Tennessee in 2010. *Streptococcus pneumoniae* is also the most common cause of community acquired pneumonia, sinusitis, and conjunctivitis. Infection is transmitted from person to person presumably through respiratory droplet contact. Those at increased risk for this infection include the elderly, children less than 2 years, children in child care facilities, African Americans, American Indians, and Alaskan Natives, and persons with underlying medical conditions. In 2013, there were 97 confirmed cases of *Streptococcus Pneumoniae* Invasive Disease in Shelby County (table 14).

Table 14 Incidence of *Streptococcus Pneumoniae* Invasive Disease in Shelby County, 2013

Number of Confirmed Cases for 2013	97
2013 incidence rate per 100,000	10.3
Age (yrs)	
Mean	53
Median	56
Min. - Max.	13 days-93 years

### Highlights

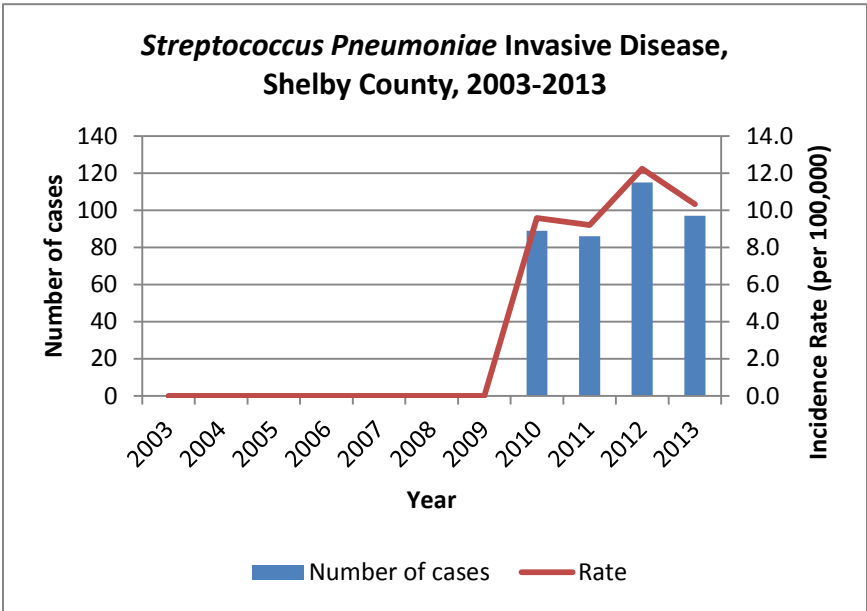


Figure 16 Number of Cases and Incidence Rate of *Strep Pneumoniae* Invasive Disease, Shelby County, TN, 2003-2013

## VANCOMYCIN RESISTANT ENTEROCOCCI (VRE) INVASIVE DISEASE

### Summary of Disease

Vancomycin-resistant Enterococci (VRE) are specific types of antimicrobial-resistant bacteria that are resistant to vancomycin; the drug often used to treat infections caused by enterococci. Enterococci are bacteria that are normally present in the human intestines and in the female genital tract and are often found in the environment. These bacteria can sometimes cause infections. Most vancomycin-resistant Enterococci infections occur in hospitals. In 2013, there were 39 confirmed cases of VRE in Shelby County (table 15).

Table 15 Incidence of Vancomycin resistant enterococci (VRE) Invasive Disease in Shelby County, 2013

<b>Number of Confirmed Cases for 2013</b>	39
<b>2013 incidence rate per 100,000</b>	4.15
<b>Age (yrs)</b>	
<b>Mean</b>	54.8
<b>Median</b>	59
<b>Min. - Max.</b>	21 days-88 years

### Highlights

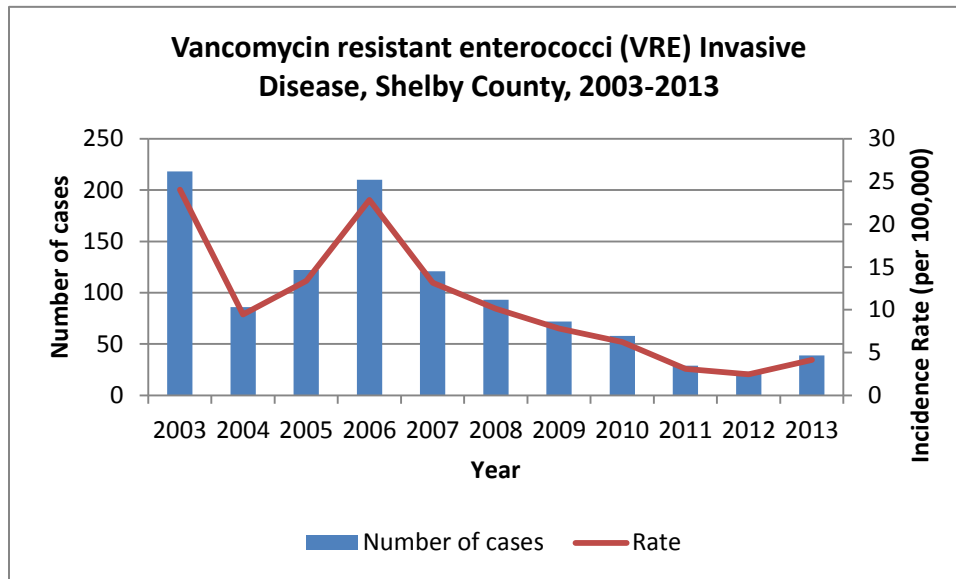


Figure 17 Number of Cases and Incidence Rate of VRE Invasive Disease, Shelby County, TN, 2003-2013

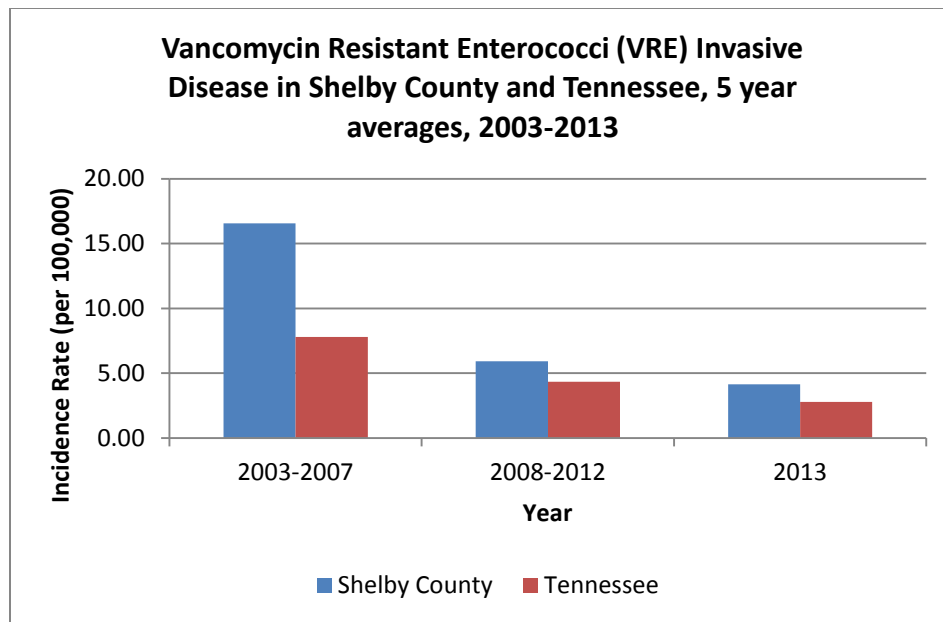


Figure 18 Invasive VRE Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

The number of VRE infections reported to the Shelby County Health Department has steadily declined each year since 2006, though they did increase in 2013. It is difficult to know precisely why the number of infections and infection rates are declining, but public health campaigns targeting improvements in infection control methods used in health care settings and efforts to ensure antibiotic treatments are appropriately prescribed by doctors and taken by patients may be part of the success story.

Enteric diseases usually are introduced into the body through the mouth and intestinal tracts. They are often spread through contaminated foods and water or through contact with the vomit or feces of an infected person or animal. Many of these enteric diseases are caused by bacteria, but viruses and parasites also cause illness as well. Enteric diseases include campylobacteriosis, cryptosporidiosis, cyclosporiasis, giardiasis, salmonellosis, and shigellosis. In Tennessee, all except giardiasis are reportable and they are notifiable in the United States. In 2013, over 300 reports of these enteric diseases were made to the Shelby County Health Department, 280 of which were considered confirmed cases (table 16). Enteric diseases accounted for about 32.5% of all confirmed reportable diseases in Shelby County for 2013.

Confirmed and suspect cases accounted for 95% of the enteric diseases reported in 2013. Salmonellosis was the most commonly reported enteric disease in Shelby County with 126 cases and an incidence rate of 13.4 cases per 100,000. This marks a 29% decrease in the number of cases for salmonellosis from 2012. It is also the most commonly reported enteric disease in the United States (table 17). The enteric disease with the second highest number of reports was shigellosis, followed by campylobacteriosis. There have been no cases of cyclosporiasis in Shelby County since 2003.

**Table 16 Incidence of Enteric Diseases in Shelby County, 2013**

Reportable Disease	Case Status				
	Confirmed case	Probable case	Suspect case	Not a case	Total Investigated
Campylobacteriosis	61	0	6	2	69
Cryptosporidiosis	7	0	0	0	7
Shiga Toxin Producing E-Coli	6	0	4	4	14
Salmonellosis	126	0	3	6	134
Shigellosis	81	0	2	2	85
Total	280	0	15	14	309

**Table 17 Incidence\* of laboratory-confirmed bacterial and parasitic infections, and post diarrheal hemolytic uremic syndrome (HUS), by year and pathogen, Foodborne Diseases Active Surveillance Network (FoodNet), United States, 2003–2013†**

Pathogen/Syndrome	Year											2010 National health objective <sup>§</sup>	2020 National health objective <sup>¶</sup>
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
<b>Surveillance population (millions)<sup>†††</sup></b>	41.75	44.34	44.77	45.32	45.84	46.33	46.76	47.15	47.52	47.90	47.90		
<i>Campylobacter</i>	12.63	12.82	12.71	12.73	12.81	12.64	12.96	13.52	14.28	14.22	13.82	12.3	8.50
<i>Listeria</i> **	0.31	0.26	0.29	0.28	0.26	0.26	0.32	0.27	0.28	0.26	0.26	0.24	0.20
<i>Salmonella</i>	14.46	14.65	14.53	14.76	14.89	16.09	15.02	17.55	16.44	16.37	15.19	6.8	11.40
<i>Shigella</i>	7.28	5.07	4.68	6.10	6.26	6.57	3.96	3.77	3.24	4.47	4.82	N/A <sup>††</sup>	N/A
<b>STEC<sup>§§</sup> O157</b>	1.06	0.91	1.06	1.30	1.20	1.12	0.99	0.95	0.97	1.11	1.15	1.0	0.60
<b>STEC non-O157</b>	0.17	0.25	0.30	0.53	0.62	0.53	0.61	0.96	1.10	1.16	1.17	N/A	N/A
<i>Vibrio</i>	0.26	0.28	0.27	0.34	0.24	0.29	0.34	0.41	0.33	0.41	0.51	N/A	0.20
<i>Yersinia</i>	0.39	0.39	0.36	0.36	0.36	0.36	0.33	0.34	0.34	0.33	0.36	N/A	0.30
<i>Cryptosporidium</i>	1.09	1.44	2.96	1.94	2.67	2.27	2.88	2.75	2.86	2.63	2.48	N/A	N/A
<i>Cyclospora</i>	0.03	0.03	0.15	0.09	0.03	0.04	0.07	0.06	0.05	0.03	0.03	N/A	N/A
<b>HUS***</b>	1.33	1.05	1.48	2.21	2.05	1.71	1.45	1.88	1.23	1.27	--	N/A	0.90

Source: Centers for Disease Control and Prevention. National Center for Emerging and Zoonotic Infectious Diseases (NCEZID) Division of Foodborne, Waterborne, and Environmental Diseases (DFWED)

\*Per 100,000 population

†Data are preliminary

§Healthy People 2010 objective targets for incidence of *Campylobacter*, *Listeria*, *Salmonella*, and Shiga toxin-producing *Escherichia coli* O157

¶Healthy People 2020 objective targets for incidence of *Campylobacter*, *Listeria*, *Salmonella*, Shiga toxin-producing *Escherichia coli* O157, *Vibrio*, and *Yersinia* infections, and HUS

\*\**Listeria* cases defined as isolation of *L. monocytogenes* from a normally sterile site or, in the setting of miscarriage or stillbirth, isolation of *L. monocytogenes* from placental or fetal tissue

††No national health objective exists for these pathogens

§§Shiga toxin-producing *Escherichia coli*

¶¶Surveillance not conducted for this pathogen in this year

\*\*\*Incidence of postdiarrheal HUS in children aged <5 years; denominator is surveillance population aged <5 years

†††U.S. Census Bureau population estimates for the surveillance area for 2012. Final incidence rates will be reported when population estimates for 2013 are available.

## CAMPYLOBACTERIOSIS

### Summary of the disease

Campylobacteriosis is one of the most common bacterial infectious diseases in the United States. Illness is usually caused by the *Campylobacter jejuni* species. Most infections are associated with handling raw poultry or eating raw or undercooked poultry, such as

chicken and turkey. Symptoms include diarrhea, cramping, abdominal pain and fever within 2 to 5 days of being exposed to the bacteria. Some cases also involve nausea and vomiting. Symptoms can last for about one week.

Most cases of campylobacteriosis do not occur as part of a large outbreak but are isolated cases with no epidemiological links. Illness occurs most frequently during the summer months and typically affects infants and young adults more often than other age groups. Also, males are affected more than females. In 2013, there were 61 confirmed cases of Campylobacteriosis in Shelby County (table 18).

**Table 18 Incidence of Campylobacteriosis in Shelby County, 2013**

<b>Number of Confirmed Cases for 2013</b>	61
<b>2013 incidence rate per 100,000</b>	6.49
<b>Age (yrs)</b>	
<b>Mean</b>	37.5
<b>Median</b>	36
<b>Min. - Max.</b>	3 months- 93 years

### *Highlights*

The mean age of the 2013 cases was 37.5 years, with the youngest affected being under a year old. There has been a general increase in campylobacter incidence since 2005, likely due to a new and simpler laboratory test being introduced, making it easier for doctors to test for this illness. In the decade of data represented, the highest incidence of disease was reported in 2012. The pattern of data trend is an upward pattern for cases in Shelby County since 2003. Over the past 10 years, the number of campylobacter cases has grown considerably. Between 2003 and 2004, the average number of reports was about 40 cases. Then there was a considerable decrease in 2005, but in the following year, there was a significant increase in the number of cases in 2006 compared to the previous years. The number of cases have essentially remained that high since then.

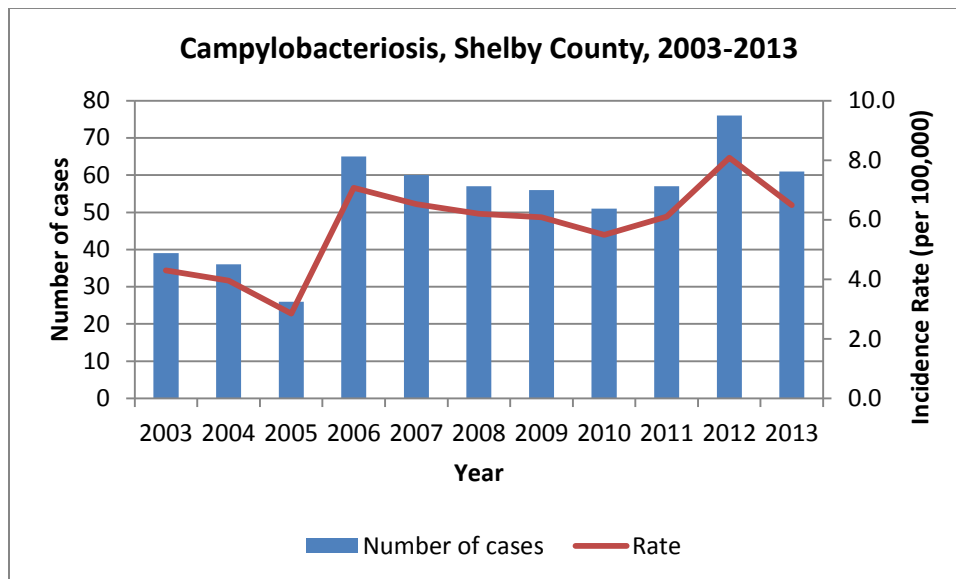


Figure 19 Number of Cases and Incidence Rate of Campylobacteriosis, Shelby County, TN, 2003-2013

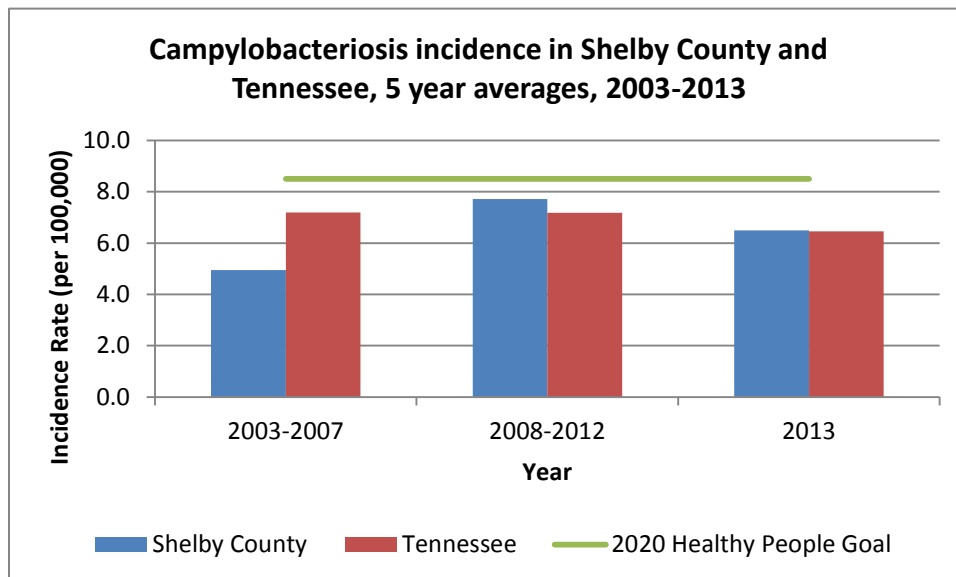


Figure 20 Campylobacteriosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

The average incidence of campylobacteriosis in Tennessee as a whole is higher compared to the incidence in Shelby County for 2003-2007. In 2008-2012, Shelby County reported a higher incidence of *Campylobacter* infections compared to Tennessee as a whole. As shown in Figure 20 the incidence of campylobacter has increased over the past years for both Shelby County and Tennessee but is starting to decrease now. The increase could have been a result of new, available, and quick testing methods. There is an increase in the use of culture independent methods as the sole method of isolating campylobacter from stools, which has in turn increased the number of reports and cases of campylobacter infections.

In regard to meeting the 2020 national health objective for the incidence of *Campylobacter*, which is 8.5 cases per 100,000 population, both Shelby County and Tennessee have met that goal for 2013.

*Summary of the disease*

Cryptosporidiosis is an illness caused by the protozoan *Cryptosporidium parvum* and is characterized by diarrhea, abdominal cramps, loss of appetite, low-grade fever and nausea and vomiting. It is possible that persons infected with the disease will not show any symptoms. The illness may be life threatening to those with compromised immune systems. Those most likely to be infected include children less than 2 years of age, animal handlers, international travelers, men who have sex with men (MSM) and anyone in close personal contact with someone who is infected. Outbreaks have occurred in day care centers and have been associated with drinking water, recreational use of water and consumption of contaminated beverages.

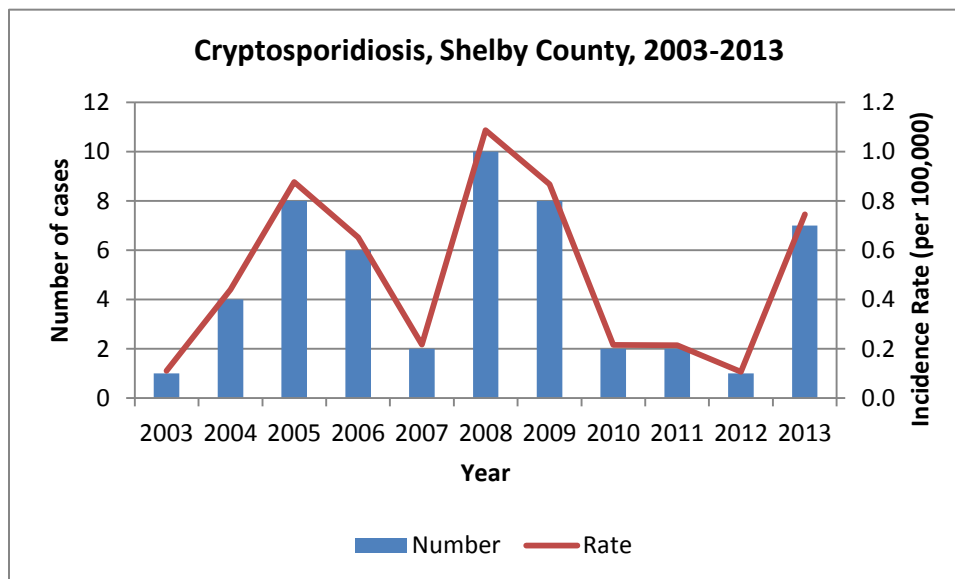
Cryptosporidiosis has become the most common waterborne disease in the United States over the past two decades. Cryptosporidiosis can be spread from person to person, animal to person, or through foodborne and waterborne transmission.

**Table 19 Incidence of Cryptosporidiosis in Shelby County, 2013**

<b>Number of Confirmed Cases for 2013</b>	7
<b>2013 incidence rate per 100,000</b>	0.75
<b>Age (yrs)</b>	
<b>Mean</b>	18
<b>Median</b>	21
<b>Min. - Max.</b>	3 years- 41 years

*Highlights*

In 2013, there were seven cases of cryptosporidiosis reported in Shelby County (table 19). There has been a steady and significant decline in the number of cases reported in Shelby County since 2008 until 2013. The highest number of cases reported occurred in 2008. Many of the cases reported in that year reported a common risk factor associated with the incidence of this disease; contact with recreational water.



**Figure 21 Number of Cases and Incidence Rate of Cryptosporidiosis, Shelby County, TN, 2003-2013**



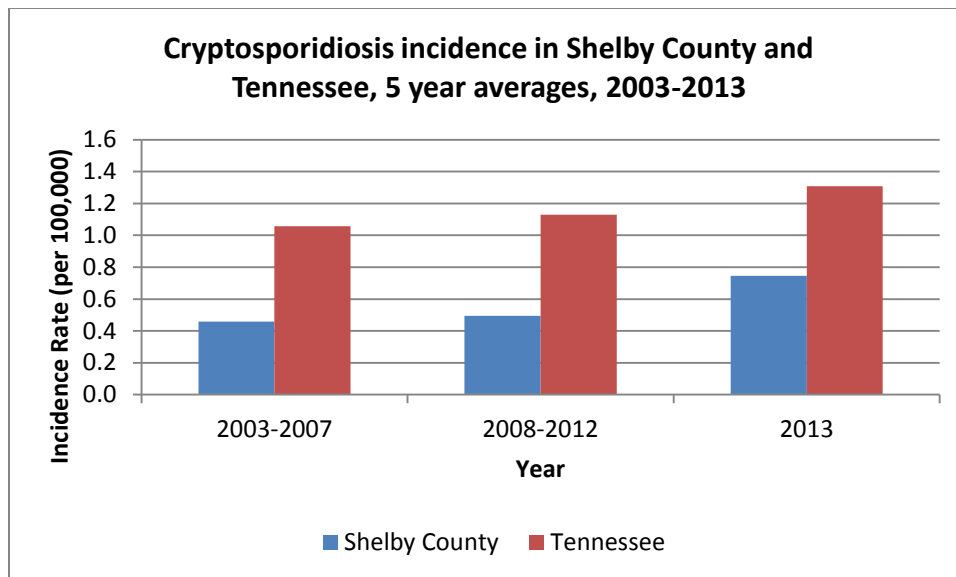


Figure 22 Cryptosporidiosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

The burden of cryptosporidiosis has been insignificant in both Shelby County and Tennessee as whole over the years compared to other communicable diseases. On average, there is less than one case of cryptosporidiosis per every 100,000 population in Shelby County. There is no Healthy People 2020 goal for cryptosporidiosis.

## ESCHERICHIA COLI, SHIGA TOXIN-PRODUCING (STEC)

### Summary of the disease

Shiga toxin-producing *Escherichia coli* (also known as STEC) is an infection characterized by diarrhea and abdominal cramps. Illness may become complicated by a condition called hemolytic uremic syndrome (HUS). Those infected by the organisms that cause STEC do not always show symptoms; and the organisms may cause extra-intestinal infections. There are many different serotypes of STEC, but there is one serotype (*E. coli* O157:H7) that is known to be the cause of most outbreaks and cases of HUS in the United States. The number of laboratory confirmed STEC infections have increased exponentially between 2008 and 2012 since all STEC infections (not just those caused by serotype O157:H7) became nationally notifiable in 2000.

The isolation of Shiga toxin-producing *Escherichia coli* from clinical specimens using an appropriate laboratory test is required to determine the presence of STEC. To be considered a suspect case, a report of post diarrheal HUS or thrombotic thrombocytopenic purpura (TTP) or demonstration of Shiga toxin in a specimen from a clinically compatible case without isolation of the organism is required. A report is classified as a probable case if there is isolation of *E. coli* O157 from a clinical specimen, without confirmation of the H antigen or Shiga toxin production is made, or a clinically compatible case that is epidemiologically linked to a confirmed or probable case or identification of an elevated antibody titer to a known Shiga toxin-producing *E. coli* serotype from a clinically compatible case. In 2013, there were only 6 confirmed cases of STEC in Shelby County (table 20).

Table 20 Incidence of Shiga toxin-Producing *E. coli* (STEC) Infection in Shelby County, 2013

<b>Number of Confirmed Cases for 2013</b>	6
<b>2013 incidence rate per 100,000</b>	0.6
<b>Age (yrs)</b>	
Mean	7.7
Median	2.5
Min. - Max.	11 months – 27 years

## Highlights

There were no confirmed cases of STEC between 2003 and 2005 in Shelby County. There was a significant jump in the reports of STEC from 2005 to 2006. As shown in Figure 23 below, the trend of STEC cases shows an upward and downward pattern since 2006 with the highest number of cases reported in 2007. Since that year, the number of cases of STEC has reduced considerably.

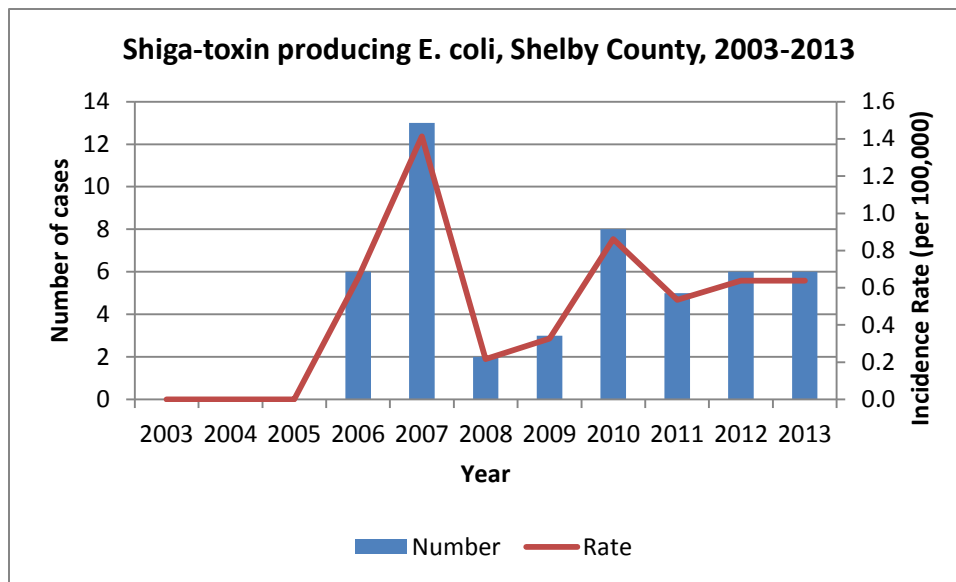


Figure 23 Number of Cases and Incidence Rate of Shiga toxin E. coli, Shelby County, TN, 2003-2013

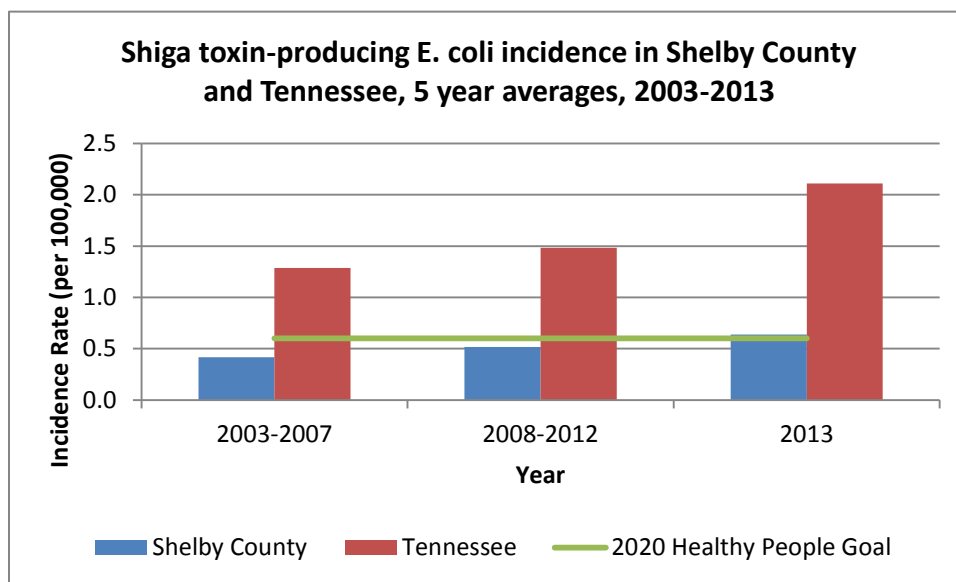


Figure 24 Shiga toxin-producing E. coli Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

Incidence of STEC has been rising in both Shelby County and Tennessee since 2003 (Figure 24). However, the incidence rate of STEC is higher in Tennessee as a whole when compared to Shelby County.

The burden of STEC in Shelby County has been considerably lower than Tennessee over the years. On average, there is often less than one case of STEC per every 100,000 population in Shelby County compared to the average 1 to 2 cases per every 100,000 people in Tennessee. The 2020 national health objective is targeting a much lower incidence of STEC; 0.6. As of 2013, Shelby County and Tennessee exceed the national 2020 target for the incidence of STEC.

SALMONELLOSIS

Summary of the disease

The bacterium *Salmonella* causes an illness called Salmonellosis. *Salmonella* species come in many different types; the most common types in the United States are *Typhimurium* and *Enteritidis*. The symptoms of infection with the bacteria include diarrhea, fever and abdominal cramps. Those infected with *Salmonella* begin to feel sick within 12 to 72 hours of exposure to the bacteria and symptoms usually resolve without treatment in 4 to 7 days. Severe dehydration requiring hospitalization may develop in some cases.

*Salmonella* is usually transmitted through ingestion of contaminated food. This includes contaminated or undercooked beef, poultry, unpasteurized milk and raw or undercooked eggs, although fresh fruits and vegetables are increasingly recognized as vehicles associated with transmission in outbreaks.

Table 21 Incidence of Salmonellosis in Shelby County, 2013

Number of Confirmed Cases for 2013	126
2013 incidence rate per 100,000	13.41
Age (yrs)	
Mean	28
Median	13.5
Min. - Max.	1 month- 90 years

Highlights

Salmonellosis is one of the most commonly reported bacterial infections in Shelby County over the past 10 years. The bacterial infection affects people of all ages as is represented in the above age data. The youngest case of salmonellosis in 2013 was reported among a one-month old child; the oldest case was 90 years old. There were 13.4 cases per every 100,000 people in Shelby County for 2013 (table 21). The trend of salmonellosis cases in Shelby County over the past 10 years shows an upward and downward pattern. The highest number of cases in the 10 year period was reported in 2010 (214 cases), and lowest number of cases was reported in 2004 (105 cases). The number of salmonella cases reported in Shelby County has decreased since 2010.

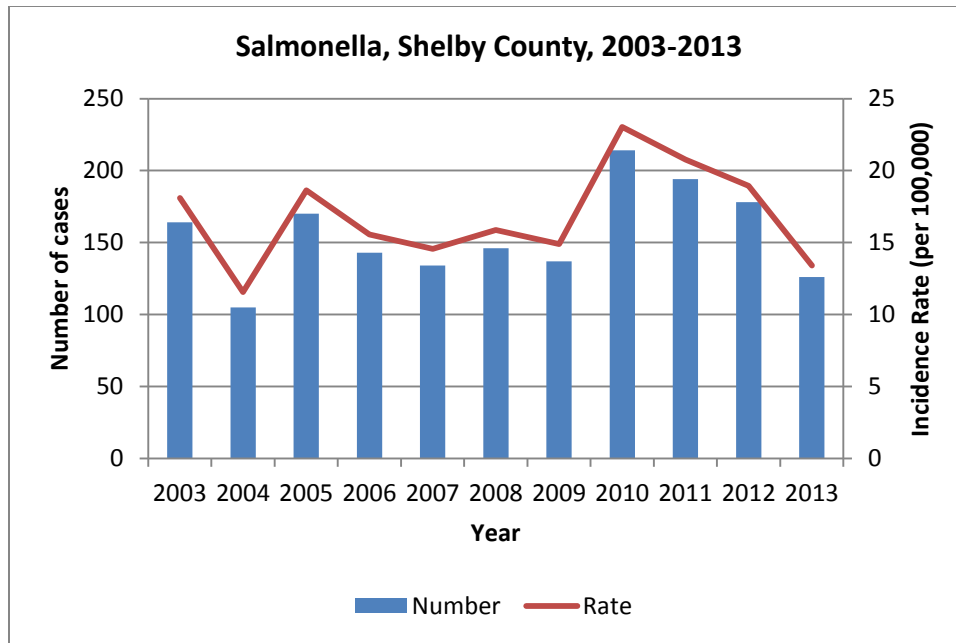


Figure 25 Number of Cases and Incidence Rate of Salmonella, Shelby County, TN, 2003-2013

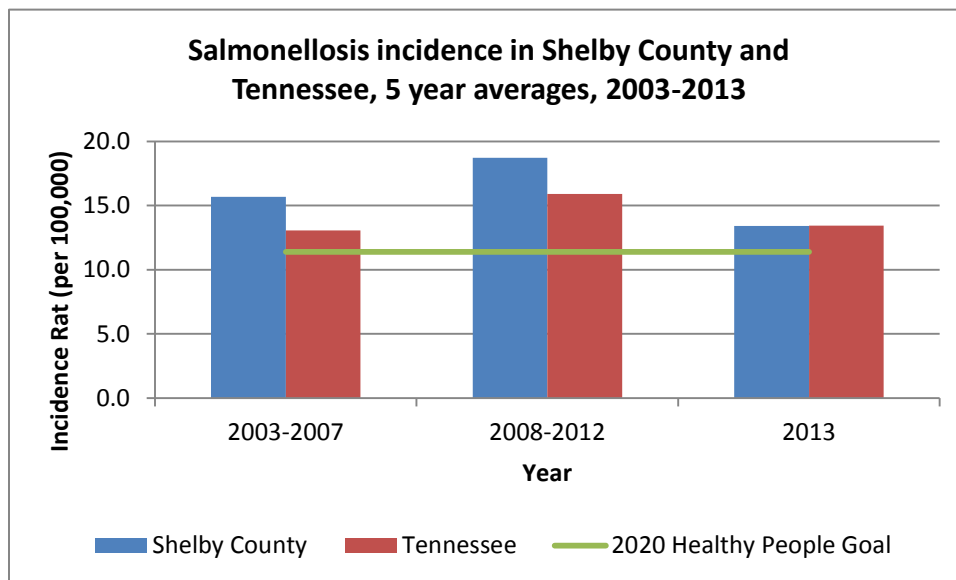


Figure 26 Salmonellosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

On average, the incidence rate of salmonellosis has been higher in Shelby County compared with Tennessee since 2003; however, in 2013 the incidence in Shelby County was just lower than Tennessee. The trend of salmonellosis incidence over the past 10 years shows an upward pattern until 2010 and then a decrease for both Shelby County and Tennessee. As of 2013, neither Shelby County nor Tennessee had achieved the 2020 national health objective for the incidence of salmonellosis per year of 11.4 cases per every 100,000 population.

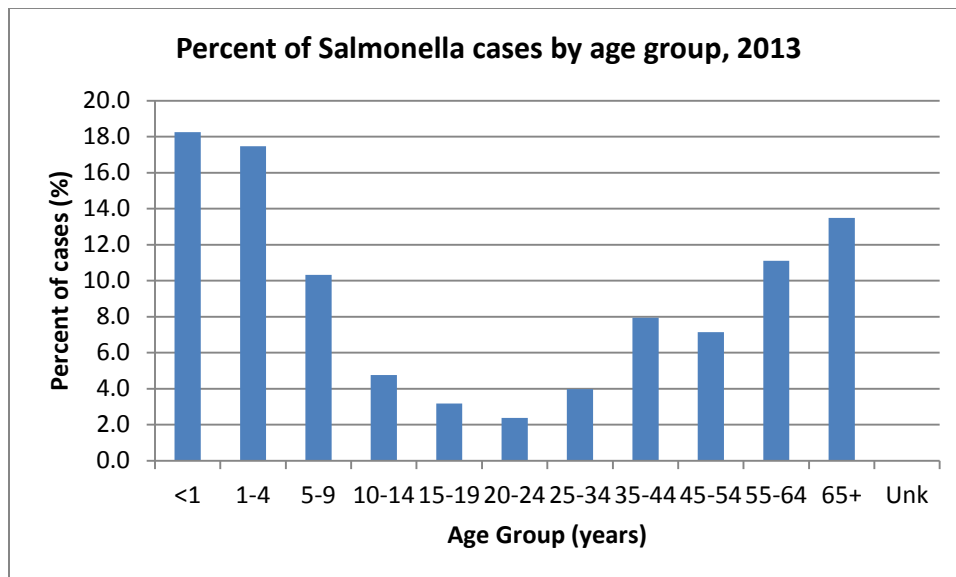


Figure 27 Percent of Salmonella cases by age group, Shelby County, 2013

About 35% of the salmonellosis infections reported for 2013 in Shelby County were reported among children under the age of 5 years old. As reported by the Centers for Disease Control and Prevention, children are the most likely to be infected with *Salmonella* species. The rate of diagnosed infections in children between the ages of 0 and 4 years old is about five times higher than the rate in all other age groups. Severe cases of salmonellosis are usually reported among young children, the elderly and immune-compromised people.

## SHIGELLOSIS

### Summary of the disease

Shigellosis is an infectious disease caused by bacteria from *Shigella* species. Symptoms of infection with this bacterium include diarrhea (often bloody diarrhea), fever and stomach cramps beginning a day or two after exposure. The illness usually resolves without treatment in 5 to 7 days. Young children and older adults may develop severe diarrhea requiring hospitalization. In children under 2 years of age, *Shigella* infection can cause high fever leading to seizures. Some infected individuals do not show symptoms but can still spread the disease to others.

Shigellosis can be passed from one person to the next. The bacteria are present in the stool of infected persons while they are sick and for up to two weeks after symptoms resolve. It is a common infection among children who are not fully toilet trained and among family members and playmates of these children. Infection may be acquired from eating contaminated foods or by drinking or swimming in contaminated water. There have been several reports of isolated cases and outbreaks of shigellosis among men who have sex with men. In order to control and prevent cases of *shigella*, health education and promotion of vigorous hand/toilet hygiene practices are necessary. In 2013, there were 81 confirmed cases of Shigellosis in Shelby County (table 22).

Table 22 Incidence of Shigellosis in Shelby County, 2013

<b>Number of Confirmed Cases for 2013</b>	81
<b>2013 incidence rate per 100,000</b>	8.62
<b>Age (yrs)</b>	
<b>Mean</b>	12
<b>Median</b>	6
<b>Min. - Max.</b>	1 month- 66 years

## Highlights

Shigellosis, like salmonellosis is a commonly reported bacterial infection in Shelby County and has one of the highest rates of incidence of all the enteric diseases. Like salmonellosis, the trend of shigellosis cases in Shelby County over the past 10 years shows an upward and downward pattern. There was a significant decrease in cases reported in 2004 and 2005 compared to the previous year of 2003. The number of cases increased significantly again in 2006 and decreased yet again in 2007. This pattern of decrease and increase in Shigellosis cases continued for the next couple years. In 2010, the number of Shigellosis cases increased from the previous year's number of cases. The number of cases of shigellosis has declined steadily since 2010.

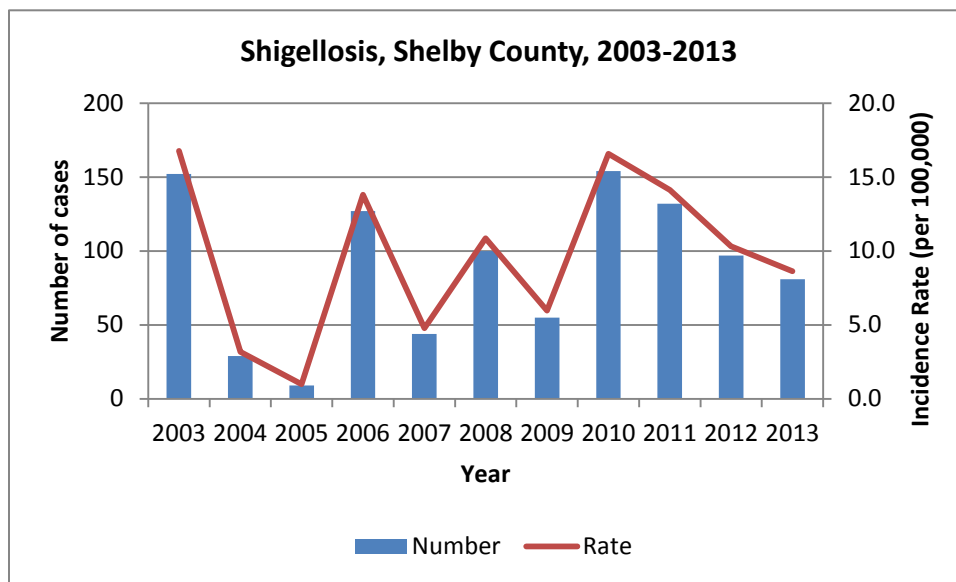


Figure 28 Number of Cases and Incidence Rate of Shigella, Shelby County, TN, 2003-2013

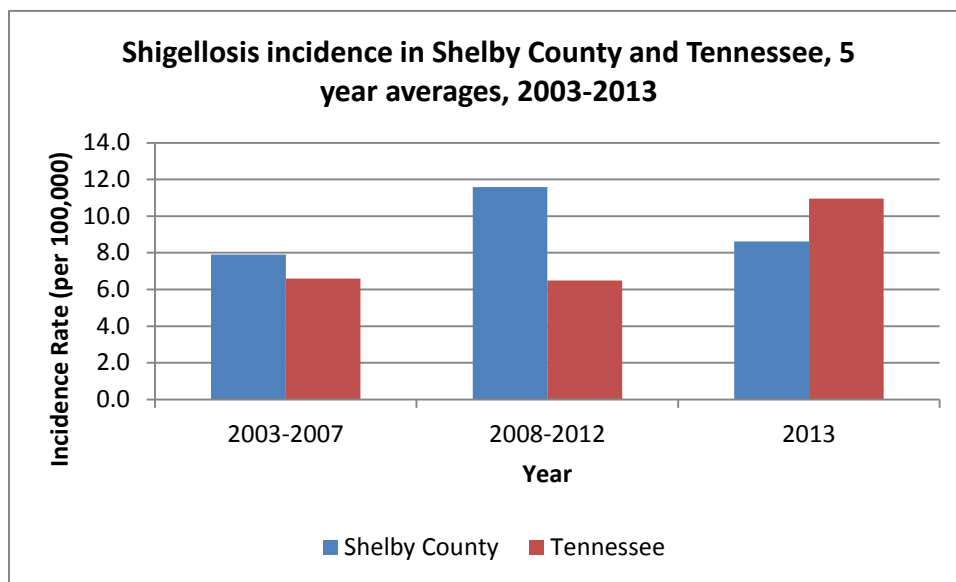


Figure 29 Shigellosis Incidence Rate by 5 Year-Average, Shelby County and Tennessee, 2003-2013

On average, for 2003 through 2013, the incidence of shigellosis in Shelby County has been higher compared to the incidence of shigellosis in Tennessee. There was an increase in the incidence rate for the averaged years of 2003-2007 and 2008-2012 in Shelby County, however, the incidence rate decreased the following year in 2013. In Tennessee, the incidence rate for the averaged years of 2003-2007 and 2008-2012 decreased slightly and then increased considerably in 2013.

There are no national health objectives for the *Shigella* pathogen.

Children under the age of 5 years are often more likely to be affected by this infection compared to other age groups. In the figure below, around 68% of the shigellosis cases in Shelby County for 2013 were among children between the ages of 1 and 9 years. Not only is shigellosis widespread among children, it is known to be widespread in families with small children also. Many shigellosis cases are related to the spread of illness in child-care settings.

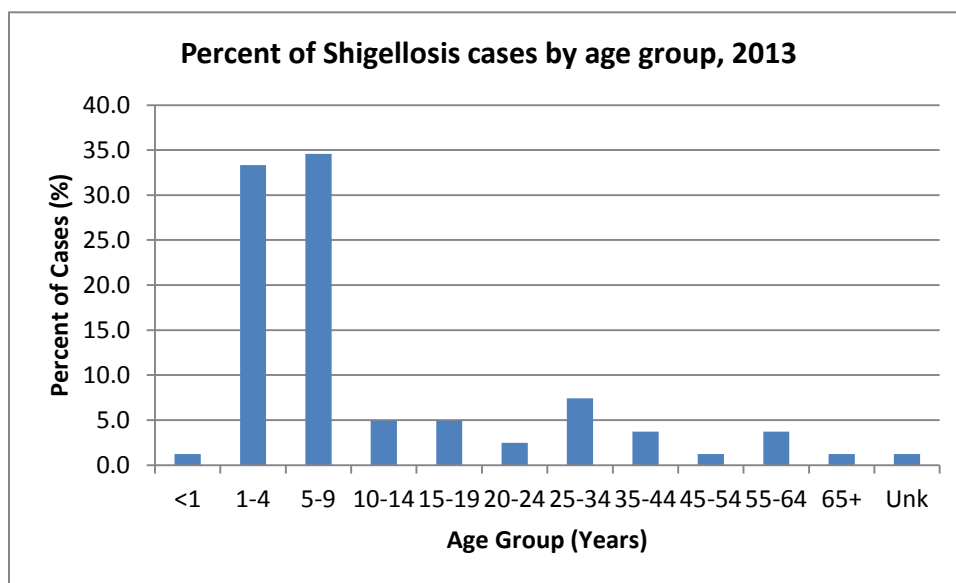


Figure 30 Percent of *Shigella* cases by age group, Shelby County, 2013

## RESPIRATORY DISEASES 8|EIGHT

The respiratory diseases reported in Shelby County include the novel influenza A or the pandemic strain of H1N1 in 2009, influenza associated pediatric deaths and Legionellosis (Legionnaire's Disease). Influenza associated pediatric deaths are reportable; fortunately there were no influenza associated pediatric deaths or novel influenza virus cases reported in Shelby County in 2013 (table 23).

Table 23 Incidence of Respiratory Diseases in Shelby County, 2013

Reportable Disease	Case Status				
	Confirmed case	Not a case	Probable case	Suspect case	Total
<b>Novel Influenza A</b>	--	--	--	--	--
<b>Influenza Associated Pediatric Deaths</b>	--	--	--	--	--
<b>Legionellosis</b>	32	2	0	4	38
<b>Total</b>	32	2	0	4	38

### INFLUENZA 2013-2014 SEASON HIGHLIGHTS

Influenza is an acute viral disease caused by multiple strains of respiratory viruses, primarily characterized by fever, body aches, sore throat and a cough. Although influenza infections are not routinely reportable, they do contribute significantly to disease morbidity and mortality, particularly for infants, elderly persons and those with compromised immune systems. Annual vaccinations can protect people from infection or reduce symptoms for those who get infected. However, vaccination rates remain low. During the 2013-2014 influenza season, flu vaccination coverage among children in the United States increased by 2.3% compared to the 2012-2013 season (58.9% versus 56.6%). Flu vaccination coverage among adults increased by 0.7% compared to the 2012-2013 season (42.4% versus 41.5%). Tennessee was among the top 5 states in the United States for influenza vaccination coverage at 52.7%.

Influenza season in Tennessee began in mid-October 2013 and continued until early June 2014, with the peak months of disease transmission and intensity of reported cases occurring from November 25, 2013- January 26, 2014. The predominant virus circulating was Influenza A (2009 H1N1), although Influenza B viruses were also circulating towards the end of the season, and a few cases were diagnosed with infection of the Influenza A (H3N2). The annual epidemic in Tennessee mirrored what was being reported nationally.

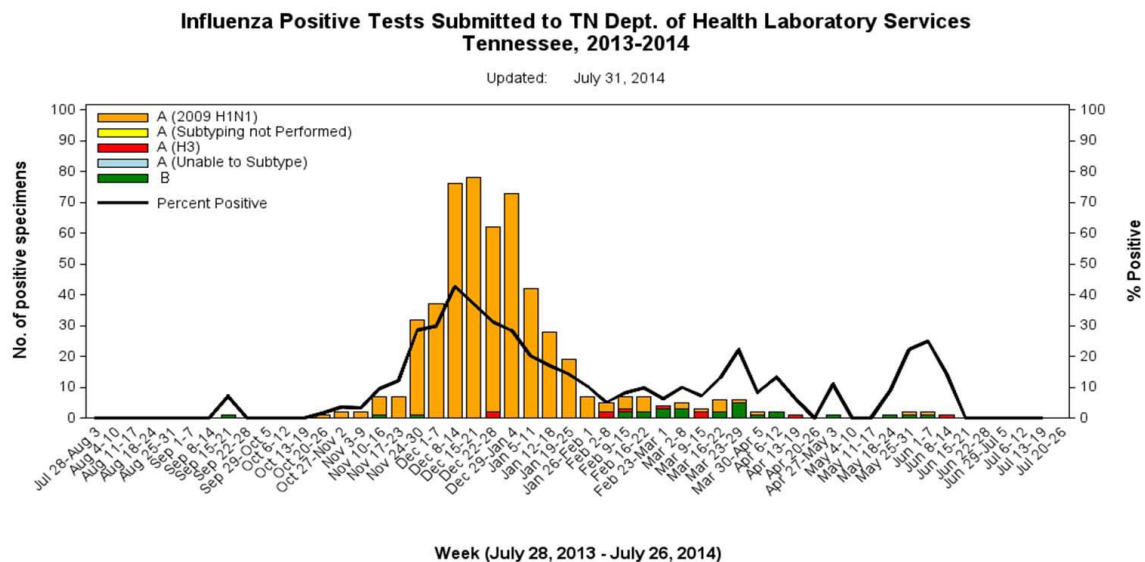


Figure 31 Distribution of influenza positive tests over the 2013-2014 influenza season



## LEGIONELLOSIS

### Summary of Disease

Legionellosis is a respiratory disease caused by strains of bacteria from the *Legionella* species. Many of these bacteria can cause illness, but most cases of Legionellosis are caused by *Legionella pneumophila* serotypes 1-6. *Legionella* species are bacteria that live primarily in warm moist environments, including soil and warm water that is 75-125°F in temperature. Symptoms of Legionellosis include cough, fever, fatigue, difficulty breathing and pneumonia. Most cases of Legionellosis are sporadic cases that cannot be associated with a particular source or exposure, but outbreaks have been associated with decorative fountains, air conditioning systems, hot tubs and hot water systems in hotels or hospitals. People with a history of smoking or other conditions and exposures that damage the lungs and people older than 55 years old are at increased risk to become infected and develop the disease. In 2013, there were 32 confirmed cases of Legionellosis (table 24).

Table 24 Incidence of Legionellosis in Shelby County, 2013

<b>Number of Confirmed Cases for 2013</b>	32
<b>2013 incidence rate per 100,000</b>	3.41
<b>Age (yrs)</b>	
<b>Mean</b>	57.5
<b>Median</b>	57
<b>Min. - Max.</b>	18 years- 87 years

### Highlights

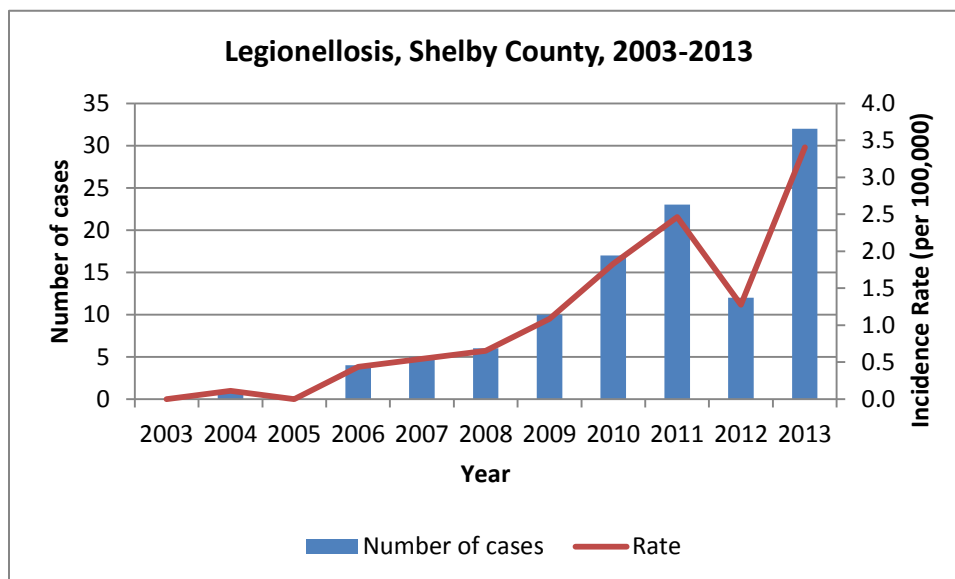


Figure 32 Number of Cases and Incidence Rate of Legionellosis, Shelby County, TN, 2003-2013

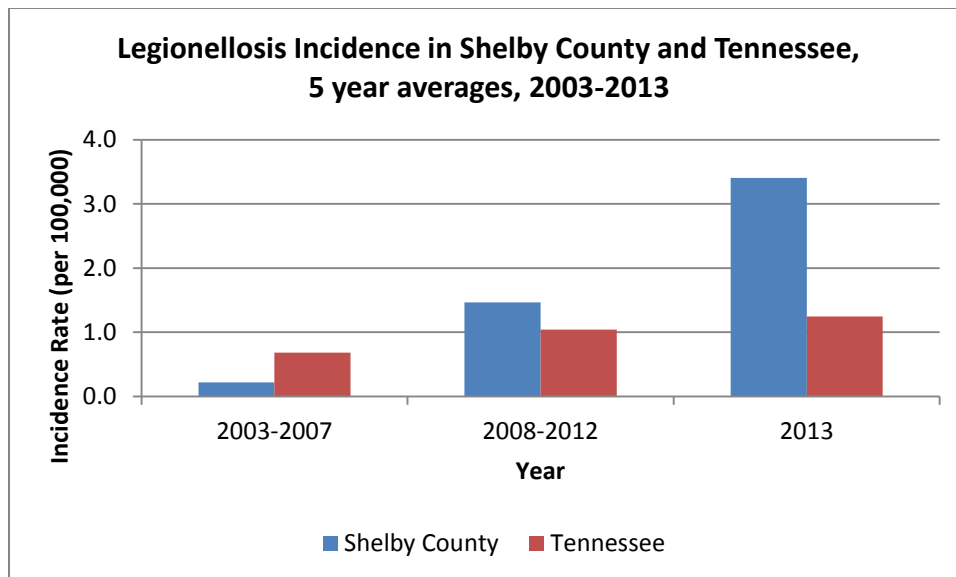


Figure 33 Legionellosis Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2003-2013

Every year, the Epidemiology Department investigates reports of disease outbreaks. In 2013, the Epidemiology Department conducted 7 outbreak investigations; 6 of them (86%) were caused by gastrointestinal diseases.

Table 25 Description of outbreaks in Shelby County, 2011-2013

	2011	2012	2013
<b>Total number of outbreaks</b>	2	3	7
<b>Number of outbreaks by type</b>			
Gastrointestinal	2 (100%)	2 (66%)	6 (86%)
Rash	0	0	0
Influenza-like illness	0	0	0
Other	0	1 (33%)	1 (14%)
<b>Number of outbreaks by facility</b>			
Restaurant/catering	1 (50%)	0	1 (14%)
Senior living	0	1 (33%)	3 (43%)
Hotel/resort	0	0	0
School/childcare	1 (50%)	2 (66%)	1 (14%)
Hospital/HC facility	0	0	1 (14%)
Other	0	0	1 (14%)

## 2013 LEGIONELLOSIS OUTBREAK INVESTIGATION

In the Spring of 2013, the Epidemiology Section received 5 positive lab tests for Legionellosis. An investigation was immediately started. Enhanced hospital-based surveillance activities were initiated and continued for weeks. All 5 patients were interviewed and no common links or activities were identified. It was determined that the patients were unlikely to be true Legionellosis cases. However, as a result of the active surveillance, more cases were identified and reported in the following days.

Seven additional reports were received by the Health Department, and six of them were determined to be confirmed cases. All seven were interviewed personally, or if the person was in the intensive care unit, through their spouse. Through the interviews, it was discovered that five of them had attended the same wet area facilities in the same fitness center within 2-10 days prior to their illness. After additional case findings, a total of 7 confirmed cases were discovered; 4 of them were associated with the outbreak (figure 34). The main symptoms were cough and pneumonia (table 26). An environmental assessment of the facility was ordered. Positive PCR and cultures from the steam room and hot tub water heater demonstrated *Legionella spp*. A remediation work plan was approved by the Health Department, and after the plan was initiated, the facility received negative culture results indicating the end of the outbreak.

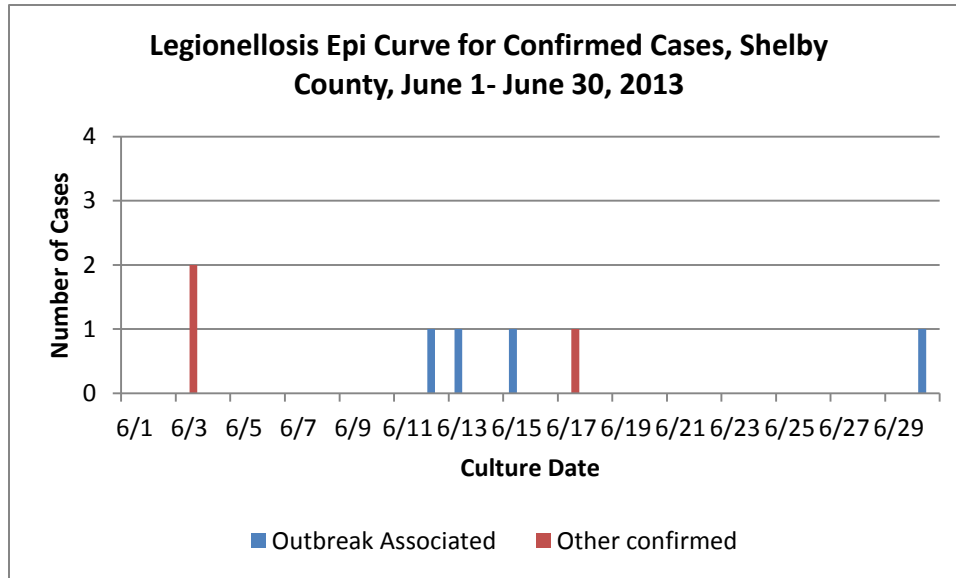


Figure 34 Epi Curve for Confirmed Cases of Legionellosis in 2013, Shelby County

Table 26 Characteristics of Confirmed cases, June 1- June 30, 2013 (n=7)

Characteristic	Cases Associated with Fitness Facility	Other Cases
<b>Total Number Ill</b>	4	3
<b>Sex</b>		
Male	4 (100%)	3 (100%)
Female	0	0
<b>Age</b>		
20-49 years	3 (75%)	0
50-74 years	1 (25%)	3 (100%)
<b>Race</b>		
African American	4 (100%)	3 (100%)
Caucasian	0	0
<b>Common Symptoms</b>		
Pneumonia	4 (100%)	3 (100%)
Fever	4 (100%)	3 (100%)
Shortness of Breath	0	2 (66%)
Cough	1 (25%)	3 (100%)
<b>Outcome of Illness</b>		
Hospitalized	3 (75%)	1 (33%)
Admitted to ICU	1 (25%)	2 (66%)
Death	0	0

## VECTOR-BORNE DISEASES 10|TEN

The vector-borne diseases reported in Shelby County in 2013 included the following: Lyme Disease, Malaria, Spotted Fever Rickettsiosis, West Nile Virus, Ehrlichiosis, Q Fever, and Dengue. In 2013, there were 168 cases of vector-borne diseases reported in Shelby County (table 27). Vector-borne diseases accounted for 1.3% of all reportable diseases (11/859) in Shelby County for 2013.

Confirmed, probable and suspect cases accounted for 34.5% (58/168 cases) of vector-borne diseases for 2013 (table 27). The most clinically significant vector-borne disease in Shelby County which receives the most attention and prevention efforts is West Nile Virus. In 2013, there were 9 total cases of West Nile Virus in Shelby County. 2 of these cases were confirmed cases, and 7 were probable cases.

There were two Vector-borne diseases in Shelby County that are not endemic to the region and were acquired as a result of international travel; Malaria and Dengue fever.

Malaria is caused by a parasite that infects the *Anopheles* mosquito, which feeds on humans. Malaria can be a very serious and sometimes fatal disease. The symptoms of malaria usually include fever and a flu-like illness, including chills, headache, muscle aches, tiredness and occasionally nausea, vomiting, and diarrhea. Most people begin to feel sick 10 days to 4 weeks after infection although some people may feel ill as early as 7 days or as late as 1 year later. Malaria is not spread from person to person, only through the bite of an infected mosquito. Prompt and effective treatment of all cases is essential to reduce the risk of severe disease and prevent death. Any traveler outside of the United States, Canada and Western Europe may be at risk for malaria. Large areas of Central and South America, Africa, South and Southeast Asia, the Middle East and Oceania are considered malaria-risk areas. The CDC provides information about precautions that travelers should take if visiting an area with a malaria risk. A healthcare provider can decide on the best antimalarial drugs depending on a traveler's plans, medical history, age, drug allergies and other health factors. Travelers should visit a healthcare provider at least 4 to 6 weeks prior to traveling to allow time for the medication to become effective.

Dengue is caused by any of the four closely related flaviviruses named Dengue 1, 2, 3, and 4. Infection with one virus does not protect you from infection with the other viruses. Sequential infections increase the risk for dengue hemorrhagic fever and dengue shock syndrome. In the majority of cases, dengue is transmitted through mosquito bites from the vectors, *Aedes aegypti* and *Aedes albopictus*. Dengue is normally transmitted through mosquito bites; therefore, it cannot be spread by casual contact between persons. There is no treatment available for dengue. Supportive therapy is recommended. There are no vaccines available to prevent infection. The best prevention measures are those taken in avoiding mosquito bites if you live in or are traveling to an endemic area.

**Table 27 Incidence of Vector-Borne Diseases in Shelby County, 2013**

Reportable Disease	Case Status				
	Confirmed case	Probable Case	Suspect case	Not a case	Total Investigated
<b>Dengue Fever</b>	0	1	0	1	2
<b>Lyme Disease</b>	0	0	14	37	51
<b>Malaria</b>	3	0	0	0	3
<b>Spotted Fever Rickettsiosis</b>	0	12	14	63	89
<b>*West Nile Virus</b>	2	7	0	5	14
<b>Ehrlichiosis</b>	0	2	2	3	7
<b>Q Fever</b>	0	1	0	1	2
<b>Total</b>	5	23	30	110	168

\*West Nile Virus cases include neuroinvasive and non-neuroinvasive cases

---

## LYME DISEASE

### *Summary of Disease*

Lyme disease is caused by a bacterium called *Borrelia burgdorferi*. This bacterium is transmitted to humans by the bite of an infected blacklegged tick. White-tailed deer ticks (*Ixodes Scapularis*) are the most likely type of tick that transmits Lyme disease in the eastern U.S.

In approximately 80% of those with Lyme disease, the first symptom is a characteristic “bull’s-eye” rash called erythema migrans. This rash usually develops 3 to 32 days after infection. Other early symptoms of Lyme disease include fever, headache, fatigue, malaise, stiff neck, muscle pain, joint pain, or swollen lymph nodes. These symptoms may last several weeks if untreated. Neurological symptoms such as aseptic meningitis and cranial neuritis may develop within weeks or months after the rash develops. Cardiac abnormalities may occur within weeks after rash onset. Weeks to years after illness onset, intermittent episodes of swelling and pain in large joints may develop and recur for several years, ultimately leading to chronic arthritis. Infection with Lyme disease usually occurs in summer, peaking in June and July. Prevention measures include insect repellent, avoiding areas with lots of ticks, checking your skin and clothes for ticks every day, removing the ticks promptly, and landscaping and integrating pest management. Patients with Lyme Disease are not infectious. There is no evidence that Lyme disease can be transmitted from air, food, water, sexual contact, insects such as mosquitoes, flies, or directly from wild or domestic animals.

Treatment normally includes oral antibiotics administered over a few weeks. Doxycycline, amoxicillin, or cefuroxime are the most common antibiotics prescribed. If patients have some neurological or cardiac forms of the illness, they may take ceftriaxone or penicillin intravenously. If the patient was diagnosed at a later stage of the disease and the symptoms continue to reoccur, they may need a second four week course of therapy.

There were no confirmed or probable cases of Lyme disease in Shelby County in 2013. There were 14 cases that were suspected to have an exposure, typically while traveling to areas of the country where Lyme disease is endemic (table 28). This is an increase from the 5 confirmed/probable cases in 2011, but a decrease from the 19 suspect cases in 2012.

**Table 28 Incidence of Suspect Lyme Disease in Shelby County, 2013**

<b>Number of Suspect Cases for 2013</b>	14
<b>2013 incidence rate per 100,000</b>	1.49
<b>Age (yrs)</b>	
<b>Mean</b>	47
<b>Median</b>	59
<b>Min. - Max.</b>	21 years- 70 years

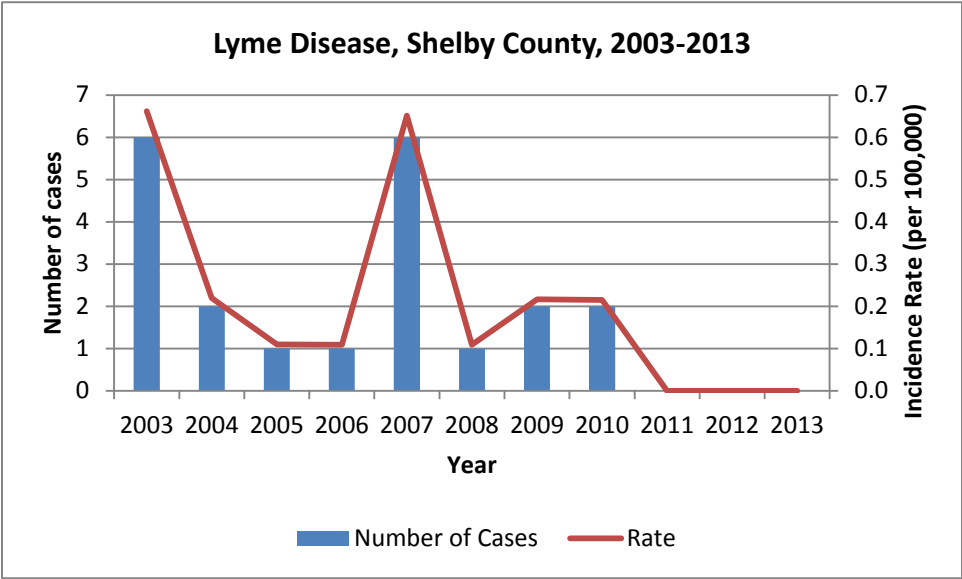


Figure 35 Number of Cases and Incidence Rate of Confirmed Lyme Disease, Shelby County, TN, 2003-2013

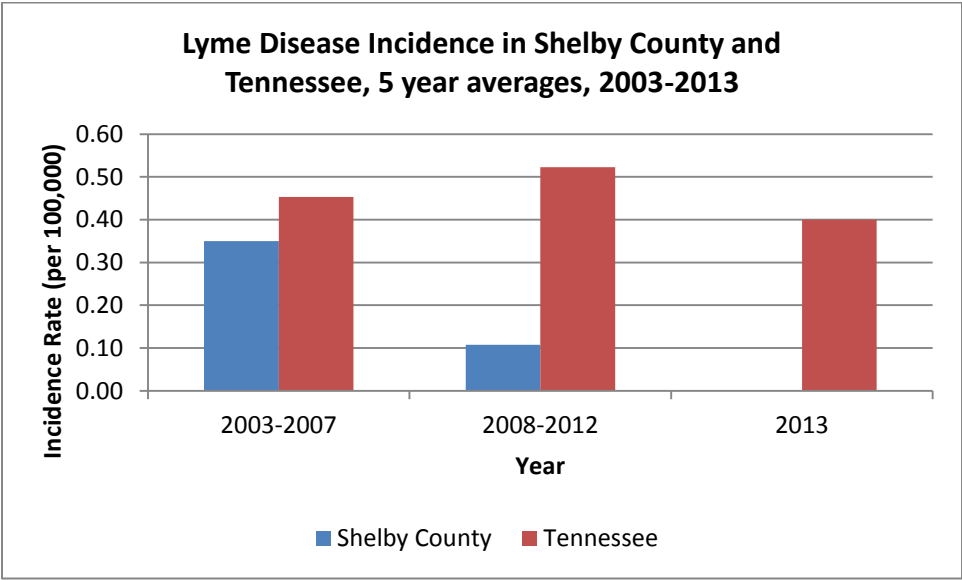


Figure 36 Lyme Disease Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2003-2013

SPOTTED FEVER RICKETTSIOSIS

Summary of Disease

Spotted Fever Rickettsiosis (SFR) is a tick-borne illness caused by *Rickettsia rickettsii*, a bacterial pathogen transmitted to humans through contact with ticks. Illness is characterized by acute onset of fever, and may be accompanied by headache, malaise, myalgia,

nausea/vomiting, or neurologic signs; a macular or maculopapular rash appears 4-7 days following onset in many (~80%) patients, often present on the palms and soles. SFR may be fatal in as many as 20% of untreated cases, and severe, fulminant disease can occur.

*Rickettsia rickettsii* can be transmitted to humans by ticks of the genera *Dermacentor*, *Amblyomma*, *Rhipicephalus*, and *Haemaphysalis*. The American dog tick (*Dermacentor variabilis*) and Rocky Mountain wood tick (*Dermacentor andersoni*) are the primary vectors and can live on small mammals, dogs, rabbits, and birds as hosts. Like other large mammals, humans are dead-end hosts. Transmission of the disease to humans typically requires that the tick be attached for at least 24-36 hours. Humans do not transmit the disease to other humans

Because ticks transmit SFR, limiting exposure to tick habitats is the best way to prevent the disease. Personal protection in tick habitats is also effective. Prompt removal of crawling or attached ticks is an important method of preventing disease.

To remove an attached tick:

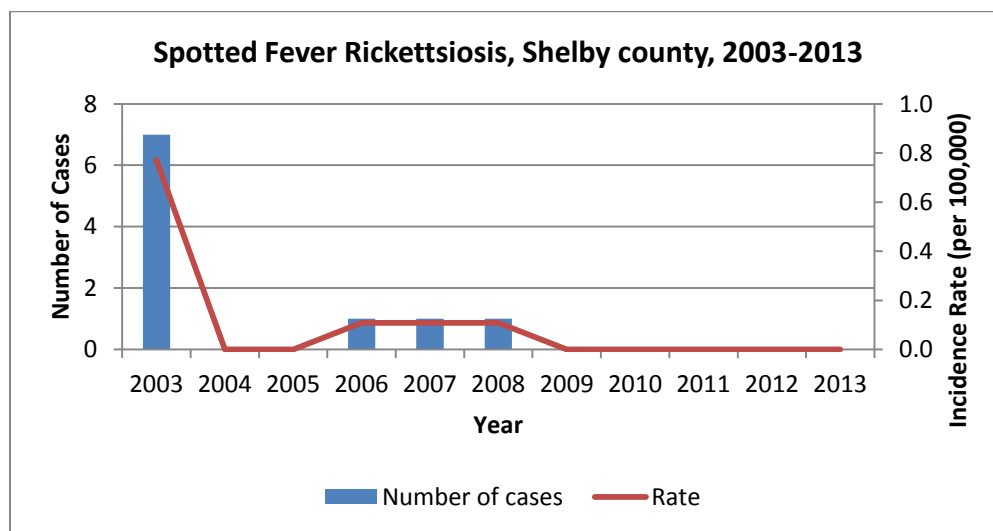
1. Grasp the tick near the mouthparts with fine-tipped tweezers.
2. Remove gently to avoid leaving mouthparts embedded in skin.
3. Disinfect the bite site and wash hands with soap and water

Although there were no confirmed cases of Spotted Fever Rickettsiosis in Shelby County in 2013, there were 12 probable cases and 14 cases that were suspected to have an exposure (table 29). In this instance, we will report on those cases.

**Table 29 Incidence of probable/suspect Spotted Fever Rickettsiosis in Shelby County, 2013**

<b>Number of Probable/Suspect Cases for 2013</b>	26
<b>2013 incidence rate per 100,000</b>	2.77
<b>Age (yrs)</b>	
Mean	44.8
Median	52
Min. - Max.	5 years- 74 years

### Highlights



**Figure 37 Number of Cases and Incidence Rate of Confirmed Spotted Fever Rickettsiosis, Shelby County, TN, 2003-2013**



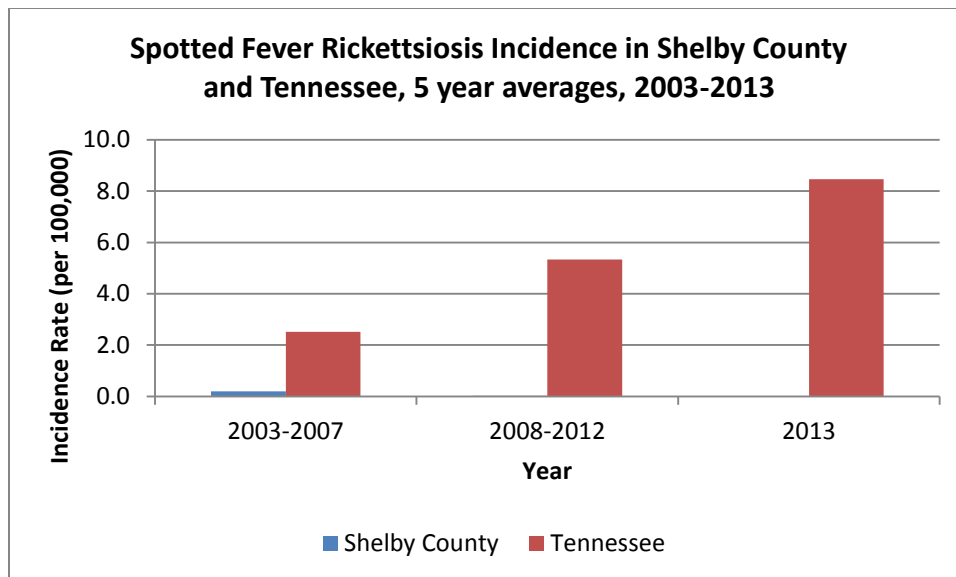


Figure 38 Spotted Fever Rickettsiosis Incidence Rate by 5 Year-Averages, Shelby County and Tennessee, 2003-2013

## WEST NILE VIRUS

### *Summary of Disease*

West Nile Virus (WNV) is a potentially serious illness that is transmitted by mosquitoes. Mosquitoes become infected when they feed on infected birds. Infected mosquitoes can then transmit the virus to humans and animals while biting to take a blood meal. The virus may be injected into the animal or human while the mosquito is feeding, possibly causing illness. Although extremely rare, WNV also has been spread through blood transfusions, organ transplants, breastfeeding, and from mother to baby during pregnancy.

WNV does not cause any symptoms in approximately 80% of those infected. Of the 20% that develop symptoms, illness can include fever, headache, body aches, nausea, vomiting and sometimes swollen lymph nodes or a skin rash on the chest. These symptoms may last as short as a few days and long as several weeks. Less than 1% of persons infected with WNV will develop severe illness. Severe symptoms may include high fever, headache, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness and paralysis. These symptoms may last several weeks, and neurological symptoms could be permanent.

People who do become ill usually develop symptoms between 3 and 14 days after being bitten by an infected mosquito. There is no specific treatment for WNV infection. In milder cases, symptoms usually pass without treatment, although illness may last weeks to months. In more severe cases, people usually need to go to the hospital to receive supportive care such as intravenous fluids, help with breathing and nursing care.

### *Highlights*

West Nile Virus was first detected in the bird population of Shelby County, Tennessee late in the season of 2001. The first human case occurred in September 2002, and there have been a total of 147 cases of WNV and 12 deaths through 2013. The majority of human cases of West Nile Virus within the state of Tennessee since 2002 have occurred in Shelby County.

**Table 30 Human Cases of West Nile Virus and Deaths, Shelby County, 2002-2013**

<b>Year</b>	<b>Total Number of Cases*</b>	<b>Fatalities</b>
<b>2002</b>	40	7
<b>2003</b>	10	0
<b>2004</b>	12	0
<b>2005</b>	13	0
<b>2006</b>	14	0
<b>2007</b>	5	0
<b>2008</b>	10	1
<b>2009</b>	5	1
<b>2010</b>	2	0
<b>2011</b>	12	2
<b>2012</b>	15	0
<b>2013</b>	9	**1
<b>Total</b>	147	12

\*Case Counts include both confirmed and probable cases as determined by the case definitions established by the Centers for Disease Control and Prevention.

\*\*Case Diagnosed in 2013 but died in 2014

The 2013 season had a similar level of activity for West Nile Virus in Shelby County compared to the previous season. For the entire season, there were a total of 9 cases (tables 31 and 32) that were determined by the most recent standard criteria set forth by the Centers for Disease Control and Prevention (CDC). Of these 9 cases, 2 were confirmed and 7 were probable. In 2013, there was one human fatality due to West Nile.

**Table 31 Incidence of West Nile Virus neuroinvasive disease in Shelby County, 2013**

<b>Number of Probable/Confirmed Cases for 2013</b>	7
<b>2013 incidence rate per 100,000</b>	0.75
<b>Age (yrs)</b>	
<b>Mean</b>	58.9
<b>Median</b>	70
<b>Min. - Max.</b>	15 years- 92 years

**Table 32 Incidence of West Nile Virus non-neuroinvasive disease in Shelby County, 2013**

<b>Number of Probable/Confirmed Cases for 2013</b>	2
<b>2013 incidence rate per 100,000</b>	0.21
<b>Age (yrs)</b>	
<b>Mean</b>	36.5
<b>Median</b>	36.5
<b>Min. - Max.</b>	9 years- 64 years

For additional information, please refer to the 2013 Shelby County West Nile Virus Report at <http://www.shelbycountyttn.gov/DocumentCenter/View/19416>

Maternal and Child Health (MCH) encompasses issues that affect the well-being of women, infants, children, and their families. Their well-being or lack thereof greatly influences the well-being of future generations and vitality of our community. This section will present data on several important MCH health indicators in Shelby County including infant mortality, premature births, low birth weight births, and teen pregnancy. Birth data were provided by the Tennessee Department of Health, Office of Policy, Planning and Assessment, Division of Health Statistics.

## INFANT MORTALITY

### Summary

An infant death is defined as the death of a baby before his or her first birthday. The infant mortality rate is the number of infant deaths for every 1,000 live births. Infant mortality is widely considered to be an important indicator of the overall health of a community, since factors impacting the well-being of a community likely also affect infant mortality rates. The leading causes of infant mortality in the United States are (1) congenital anomalies, followed by (2) disorders related to short gestation and low birth weight. In Shelby County, disorders related to short gestation and low birth weight are the top leading causes followed by congenital malformations. A woman's health and well-being over her life course, not only during pregnancy, contributes to her likelihood of having a positive birth outcome. The infant mortality rate in Shelby County is among the highest in the nation. In 2013, the infant mortality rate was 9.2 infant deaths per 1,000 live births compared to a national rate of 6.0. In recent years, infant mortality rates have been declining both nationally and locally, however, racial disparities persist. Black/African Americans experience the highest infant mortality rates, and in Shelby County, their rates are three times that of White rates. The Healthy People 2020 target for infant mortality rate is 6.0 infant deaths per 1,000 live births.

### Highlights

In 2013, there were 127 infant deaths and an infant mortality rate of 9.2 infant deaths per 1,000 live births in Shelby County. Over the past decade (2003-2013), there has been an overall decline in infant mortality of about 28% (12.8 infant deaths per 1,000 live births in 2004 to 9.2 in 2013).

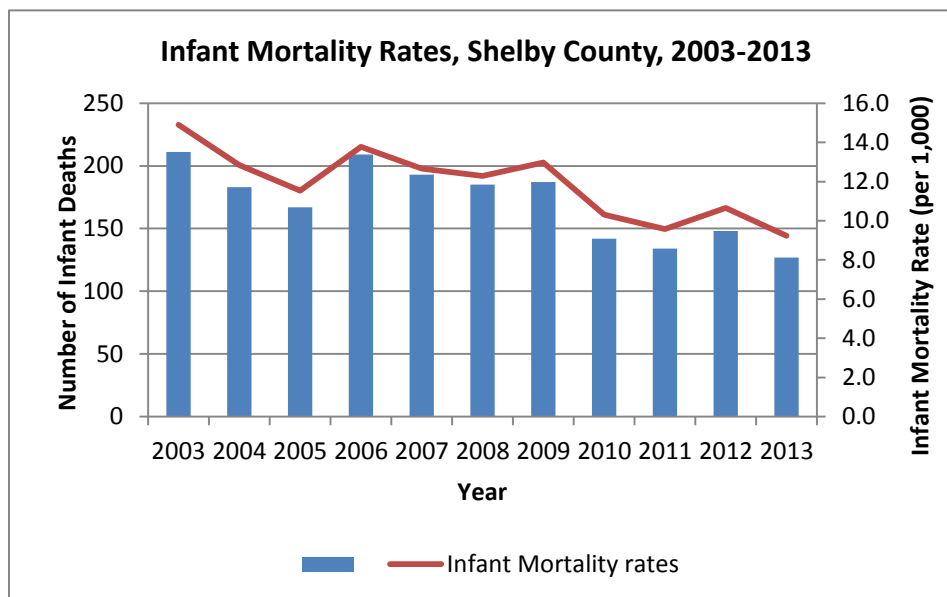


Figure 39 Number and Rate of Infant Mortality, Shelby County, 2003-2013

Figure 40 depicts three-year rolling average infant mortality rates by race-ethnicity. Three-year rolling averages are used to smooth year to year fluctuations in rates due to small numbers. Infant mortality rates are highest among Black/African Americans, with a rate of 13.2 in 2011-2013 compared to 4.6 for Hispanics, and 4.4 for Non-Hispanic Whites. The infant mortality rate among infants born to Black/African American women decreased by 4.8 deaths per 1,000 live births between 2003-2005 and 2011-2013 (19.4 to 13.2 deaths per 1,000 live births), compared to declines of 2.0 and 1.7 for Hispanics and Non-Hispanic Whites respectively.

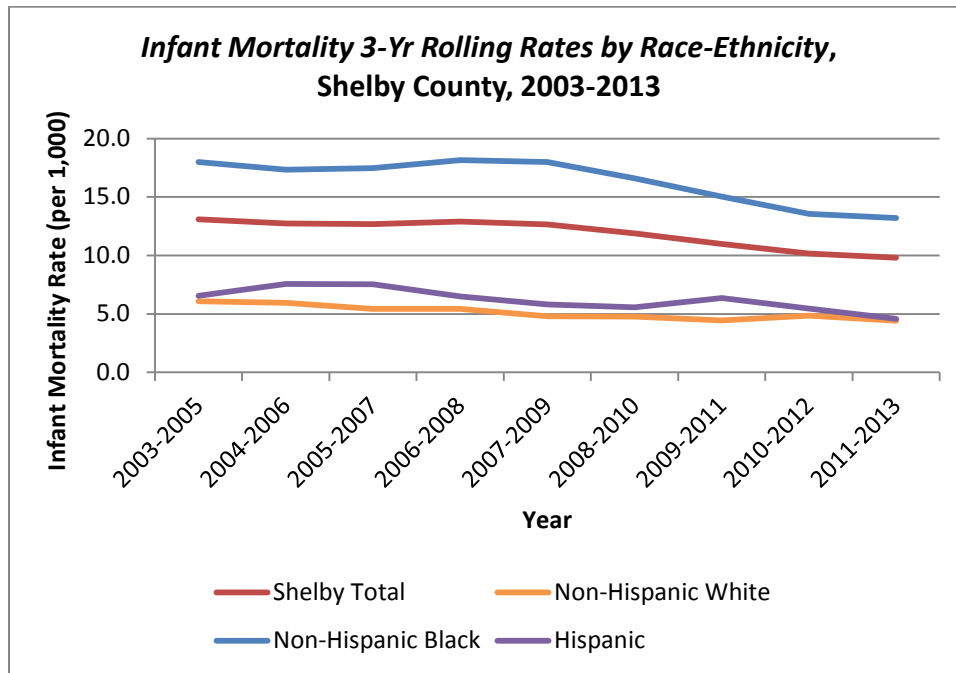


Figure 40 Infant Mortality Rate by Race-Ethnicity, Shelby County, 2003-2013

Table 33 Number of Infant Deaths, Live Births and Infant Mortality Rate, 2003-2013

Year	Number of Infant Deaths	Number of Live Births	Infant Mortality Rates (Deaths per 1,000 Live Births)
2003	211	14155	14.9
2004	183	14252	12.8
2005	167	14481	11.5
2006	209	15171	13.8
2007	193	15237	12.7
2008	185	15051	12.3
2009	187	14409	13.0
2010	142	13781	10.3
2011	134	13993	9.6
2012	148	13898	10.6
2013	127	13760	9.2

## PRETERM BIRTHS

### Summary

A premature or preterm birth is a birth that occurs before 37 completed weeks of gestation. Babies who are born prematurely are at a greater risk of infant death or lifelong disabilities. According to the Centers for Disease Control and Prevention, preterm-related causes of death accounted for 35% of infant deaths in the United States in 2010. There are many factors that can lead to or are associated with a preterm birth, including but not limited to preeclampsia, intrauterine growth restriction, vascular disease, infections, having multiples (twins, triplets, etc), tobacco, alcohol, or illicit substance use, stress, and late prenatal care. Nationally, the preterm birth rate declined significantly and steadily during 2006 to 2013 (from 12.8% to 11.4%); In Shelby County, for the same time period, preterm birth rates also declined but to a lesser extent (from 13.7% to 12.9%), and the decline was primarily between 2006 and 2007. Rates of preterm birth are consistently higher in Shelby County than in the United States overall. The rate in Shelby County in 2013 was 12.9% compared to 11.4% for the United States. The Healthy People 2020 target for preterm births is 11.4%.

### Highlights

In 2013, there were 1,780 babies born prematurely, and the preterm birth rate was 12.9% in Shelby County. After a peak in 2005-2006, there was a decline in the preterm birth rate between 2006 and 2007; however, the rate has remained relatively steady since 2007.

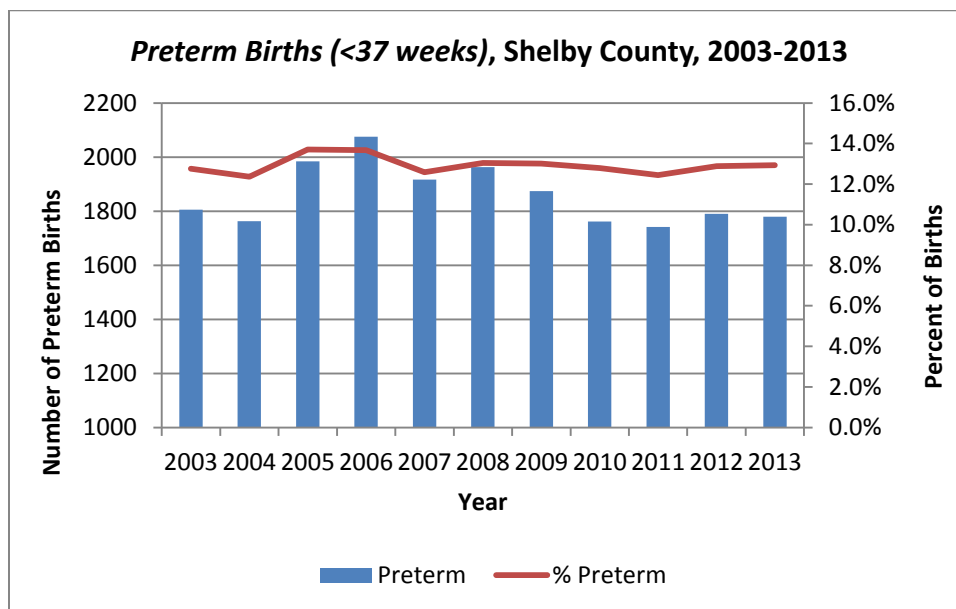


Figure 41 Number and Rate of Preterm Births, Shelby County, 2003-2013

Figure 42 depicts three-year rolling average preterm birth rates. Three-year rolling averages are used to smooth year to year fluctuations in rates due to small numbers. Preterm birth rates are highest among Black/African Americans, with a rate of 14.9% in 2011-2013 compared to 9.3% for Hispanics, and 9.8% for Non-Hispanic Whites. The preterm birth rate among infants born to Non-Hispanic Black/African American women and to Non-Hispanic White women decreased slightly between the time periods of 2006-2008 and 2007-2009 by 0.5 and 0.3 percentage points respectively, while rates increased for Hispanics by 0.4 percentage points. It is important to note that only about 5-10% of all births are to Hispanic mothers, and their rates may have greater fluctuation in part due to smaller numbers.

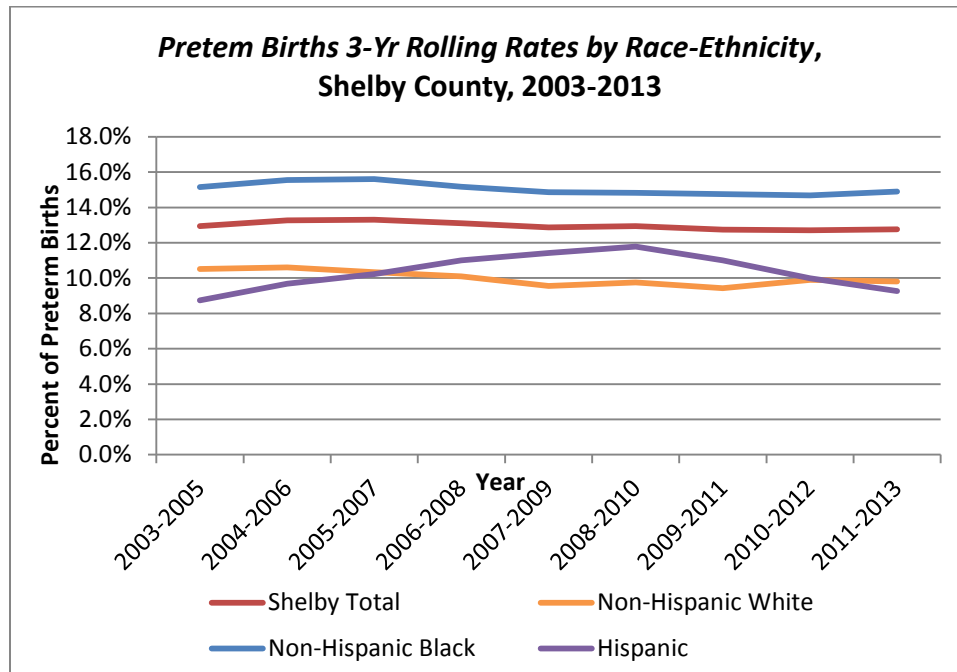


Figure 42 Preterm Birth Rate by Race-Ethnicity, Shelby County, 2003-2013

Table 34 Number of Preterm Births, Live Births and Preterm Birth Rate, 2003-2013

Year	Number of Preterm Births	Number of Live Births	Percent of Births that are Preterm
2003	1806	14155	12.8%
2004	1763	14252	12.4%
2005	1984	14481	13.7%
2006	2075	15171	13.7%
2007	1917	15237	12.6%
2008	1963	15051	13.0%
2009	1874	14409	13.0%
2010	1762	13781	12.8%
2011	1742	13993	12.4%
2012	1790	13898	12.9%
2013	1780	13760	12.9%

## LOW BIRTH WEIGHT BIRTHS

### Summary

A low birth weight (LBW) birth is a birth to a baby that weighs less than 2500 grams (5 pounds, 8 ounces). Babies who are born with low birth weight are at a greater risk of infant death or lifelong disabilities. Frequently babies are born with low birth weight as the result of a premature birth; however, intrauterine growth restriction (IUGR) can also lead to a low birth weight, even in full term babies. IUGR can be the result of many causes, including but not limited to placental abnormalities, diabetes, hypertension, heart disease, kidney disease, lung disease, blood clotting disorders, certain infections, chromosomal abnormalities, malnutrition, carrying multiples, tobacco, alcohol, or illicit substance use. Nationally, the rate of low birth weight births declined somewhat from 8.3% in 2006 to 8.0% in 2013: In Shelby County, for the same time period, rates remained relatively steady with a small increase in recent years for an overall increase from 11.3% in 2006 to 11.7% in 2013. Rates of low birth weight are consistently higher in Shelby County than in the United States overall. The rate in Shelby County in 2013 was 11.7% compared to 8.0% for the United States. The Healthy People 2020 target for low birth weight births is 7.8%.

### Highlights

In 2013, there were 1,611 babies born with a low birth weight, and the rate of low birth weight was 11.7% in Shelby County. Over the past decade (2004-2013), rates of low birth weight has remained relatively steady with fluctuations between 11.3% and 11.8%.

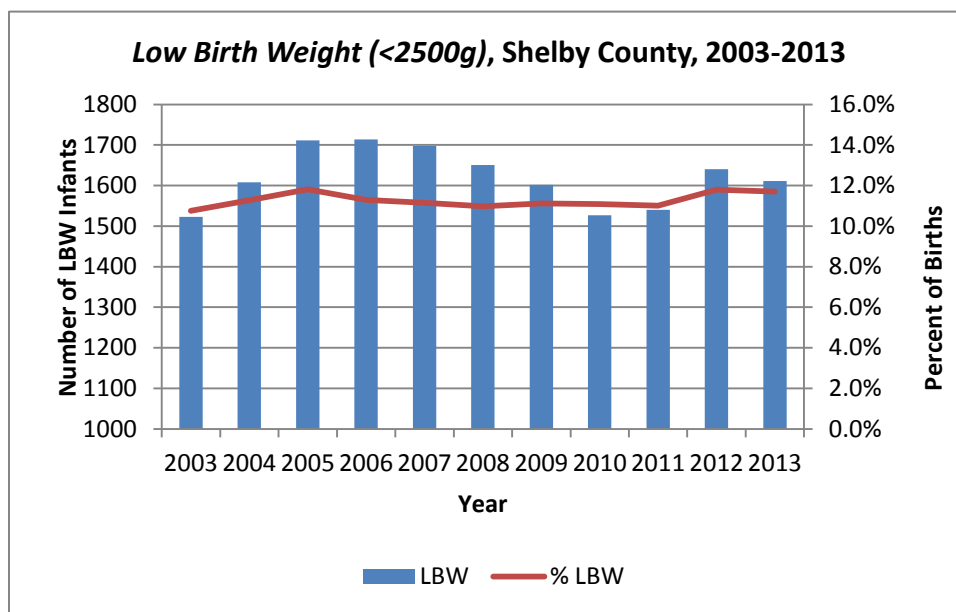


Figure 43 Number and Rate of Low Birth Weight Births, Shelby County, 2003-2013



Figure 44 depicts three-year rolling average low birth weight rates by race-ethnicity. Three-year rolling averages are used to smooth year to year fluctuations in rates due to small numbers. Low birth weight births are highest among Black/African Americans, with a rate of 14.5% in 2011-2013 compared to 6.2% for Hispanics, and 7.2% for Non-Hispanic Whites.

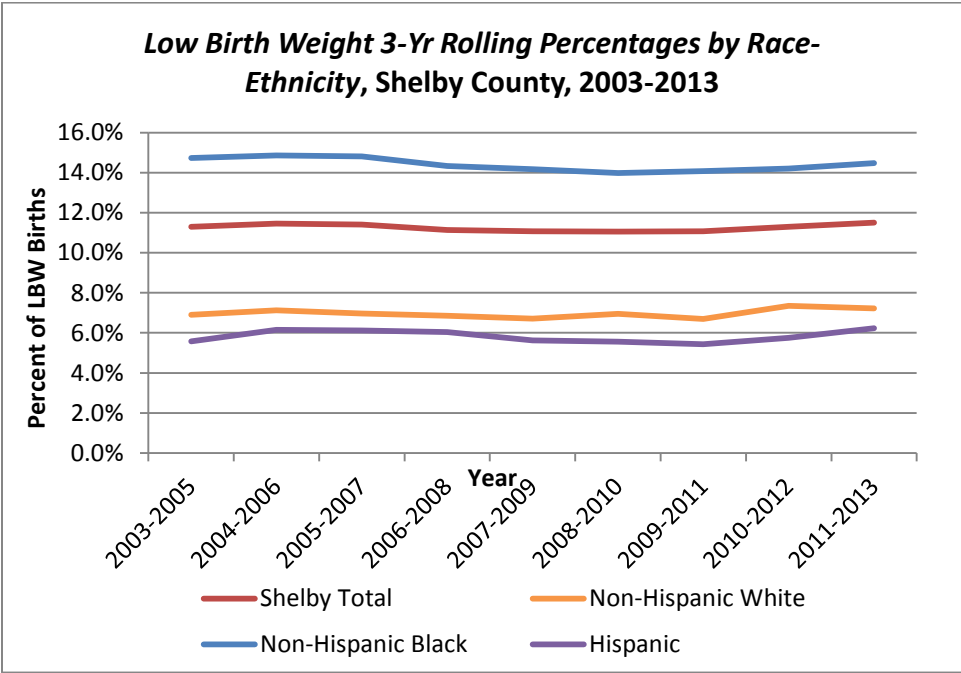


Figure 44 Low Birth Weight Birth Rate by Race-Ethnicity, Shelby County, 2003-2013

Table 35 Number of Low Birth Weight Births, Live Births and Low Birth Weight Birth Rate, 2003-2013

Year	Number of Infants with LBW	Number of Live Births	Percent of Births that are LBW
2003	1523	14155	10.8%
2004	1608	14252	11.3%
2005	1711	14481	11.8%
2006	1714	15171	11.3%
2007	1698	15237	11.1%
2008	1651	15051	11.0%
2009	1602	14409	11.1%
2010	1527	13781	11.1%
2011	1540	13993	11.0%
2012	1640	13898	11.8%
2013	1611	13760	11.7%

## TEEN FERTILITY RATES

### Summary

There are many potential immediate and long-term impacts of teen childbearing. Infant mortality, low birth weight, and premature birth rates are higher among children born to teen mothers, and they are more likely to have health problems, lower school achievement, give birth as a teenager themselves, as well as many other negative outcomes. Additionally, teen mothers are less likely complete high school or go onto college and more likely to be single parents. Preventing teen pregnancies is one of CDC's top six priorities as a "winnable battle" in public health. Nationally, teen fertility rates have been declining since 1991 (with the exception of an increase in 2006) and reached a historic low of 26.5 births per 1,000 females ages 15-19 in 2013. In Shelby County, teen fertility rates have also been declining since 1991, but with increasing rates from 2004 to 2007 before continuing a steady downward decline to a low of 43.1 per 1,000. Teen fertility rates are consistently higher in Shelby County than in the United States overall. The teen fertility rate in Shelby County in 2013 was 43.1 births per 1,000 females ages 15-19 compared to 26.5 for the United States. Teen fertility rates in Shelby County are frequently measured as births to teens ages 10-19, and the fertility rate for this age group was 22.1 births per 1,000 females ages 10 – 19 years.

### Highlights

In 2013, there were 1,448 babies (about 11% of all births) born to teen mothers ages 10 – 19 and the teen fertility rate was 22.1 births per 1,000 females ages 10 – 19 years. After a peak in 2007, teen fertility rates have been steadily declining for an overall decline of about 34% between 2007 and 2013 (from 33.6 births per 1,000 females ages 10-19 in 2007 to 22.1 in 2013).

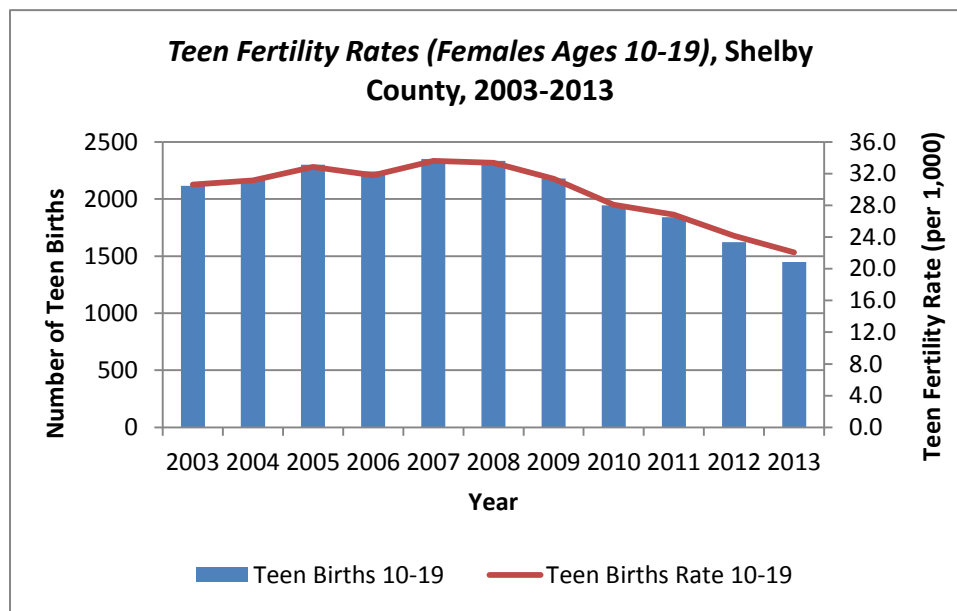


Figure 45 Number and Rate of Teen Births, Shelby County, 2003-2013

Figure 46 depicts three-year rolling average teen fertility rates. Three-year rolling averages are used to smooth year to year fluctuations in rates due to small numbers. Teen fertility rates are highest among Hispanics, with a rate of 40.2 live births per 1,000 females ages 10-19 in 2011-2013 compared to 37.1 for Non-Hispanic Black/African American, and 8.1 for Non-Hispanic Whites. The teen fertility rate has declined substantially for Hispanics since 2005-2007; rates for Non-Hispanic Black/African American

women have been declining since 2008-2010; and, rates for Non-Hispanic Whites have been slowly declining during the entire time period presented. It is important to note that only about 4-10% of all teen births are to Hispanic mothers and their rates may have greater fluctuation in part due to smaller numbers as well as changing population estimates for the Hispanic population.

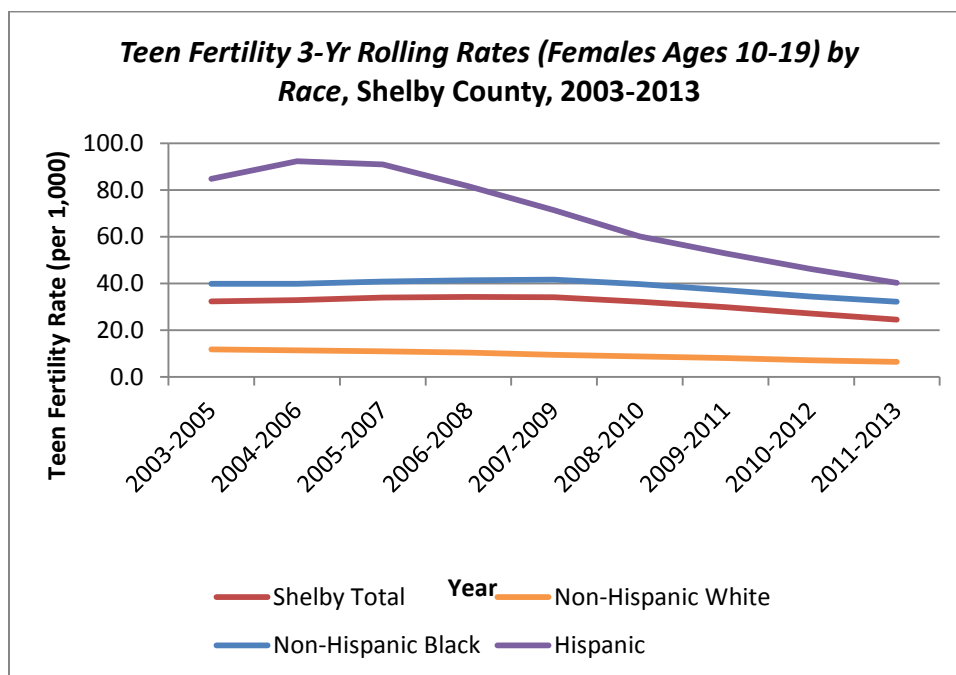


Figure 46 Teen Fertility Rate by Race-Ethnicity, Shelby County, 2003-2013

Table 36 Number of Teen Births, Live Births and Teen Fertility Rate, 2003-2013

Year	Number of Teen Births (Ages 10-19)	Population Estimate (Females, Ages 10-19)	Teen Fertility Rates (Births per 1,000 Females, Ages 10-19)
2003	2116	69145	30.6
2004	2169	69630	31.2
2005	2299	70037	32.8
2006	2241	70482	31.8
2007	2352	70028	33.6
2008	2334	69968	33.4
2009	2181	69534	31.4
2010	1943	69220	28.1
2011	1840	68601	26.8
2012	1623	67150	24.2
2013	1448	65581	22.1

### CARBON MONOXIDE POISONING

#### *Summary*

Carbon monoxide (CO) is an odorless, colorless and poisonous gas. CO poisoning occurs when unsafe amounts of CO gas is inhaled. Certain groups that are more easily affected by carbon monoxide poisoning include unborn babies, infants, children, pregnant women, people with chronic health conditions and smokers. Males are more likely to die from CO poisoning than females, which is attributed to high-risk behaviors such as working in enclosed spaces with combustion-engine-driven tools. The CO poisoning death rate is highest among persons  $\geq 65$  years of age. CO poisoning often causes dizziness, headache, nausea, and shortness of breath. CO poisoning can cause death within minutes inside enclosed, semi-enclosed or poorly ventilated areas. About 50% of all carbon monoxide poisonings occur inside the home, 40% are automobile-related, and 10% occur at work. It is produced by incomplete combustion of fuel. Operating or burning the following may produce CO:

- Gas furnaces and water heaters
- Cars, trucks, boats, and other vehicles
- Small gasoline-powered equipment like generators, weed trimmers, and chain saws
- Gas stoves, cooktops, and ovens
- Gas lanterns
- Wood and gas fireplaces
- Charcoal and wood stoves
- Any heating system or appliance that burns gas, oil, wood, gasoline, propane, or kerosene

A thorough medical history may provide clues that a patient has CO poisoning. Providers should ask specifically about home appliances used for heating, cooking and electrical generation and whether there has been any recent work to home heating or hot water systems. People who live or work together and present with similar, nonspecific symptoms increase the index of suspicion. Common symptoms of CO exposure include headache, dizziness, flushing, fatigue, nausea, vomiting, weakness and confusion.

#### *Highlights*

Carbon Monoxide poisoning has only recently been listed as a reportable disease in the state of Tennessee. Shelby County started collecting Carbon Monoxide poisoning data in 2013. In 2013, there were 6 confirmed cases of Carbon Monoxide poisoning.

### LEAD POISONING

#### *Summary*

Lead affects the central nervous system and can interfere with the production of hemoglobin (which is needed to carry oxygen to cells) and with the body's ability to use calcium. The most common symptom of acute lead poisoning is colicky abdominal pain evolving over days to weeks. Constipation, diarrhea, and nonspecific complaints of irritability, fatigue, weakness and muscle pain may also occur. Lifelong effects, such as lowered IQ, learning disabilities and behavioral problems, can result from lead exposure. At very high levels, seizures, coma, and even death have also been reported.

Routes of exposure to lead include contaminated air, water, soil, food, and consumer products. Occupational exposure is a common cause of lead poisoning in adults. One of the largest threats to children is lead paint that exists in many homes, especially older ones; thus children in older housing with chipping paint are at greater risk. Over the long term, lead poisoning in children can lead to learning disabilities, behavioral problems and mental retardation. At very high levels, lead poisoning can cause seizures, coma, and even death. Lead is ingested or inhaled. The most common source of lead exposure is **inhalation** of lead containing dust.

A blood lead test is the **only** way to know if a child has been exposed to lead. There is no natural level of lead in the blood. The CDC defines lead poisoning as a blood lead level  $\geq 5$   $\mu\text{g/dL}$  from a venous specimen.

### *Highlights*

Shelby County Childhood Lead Poisoning Prevention Program (CLPPP) conducts a variety of activities including screening children in high-risk areas at Head Start centers and local health fairs and identifying and providing case management of lead-poisoned children.

**Table 37 CLPPP Childhood Lead Screenings 2003-2013**

<b>Year</b>	<b>Total Number of Initial BLL Screening Tests</b>	<b>Initial BLL &gt; 10</b>	<b>Initial BLL 5 - 9</b>
<b>2003</b>	12,722	432	2,318
<b>2004</b>	16,486	254	2,762
<b>2005</b>	16,091	174	1,961
<b>2006</b>	15,139	134	1,124
<b>2007</b>	16,244	100	1,415
<b>2008</b>	18,497	101	1,999
<b>2009</b>	17,780	101	1,347
<b>2010</b>	18,344	127	946
<b>2011</b>	21,017	178	831
<b>2012</b>	18,246	66	721
<b>2013</b>	19,027	99	537



**Public Health**  
Prevent. Promote. Protect.  
Shelby County Health Department

Twitter: [ShelbyTNHealth](#)

Facebook: [www.facebook.com/ShelbyTNHealth](https://www.facebook.com/ShelbyTNHealth)